COMMUNITY-BASED ENVIRONMENTAL MANAGEMENT INFORMATION SYSTEM (CEMIS) MODULE NO. 4

GUIDELINES FOR ASSESSING EFFECTING DEMAND OF COMMUNITIES FOR ENVIRONMENTAL INFRASTRUCTURE

United Nations Centre for Human Settlements (Habitat)
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FOREWORD

The adequate availability of basic infrastructure services such as water supply and sanitation is an important contributor to health, well being and economic productivity of our society. Unfortunately, despite the efforts made during the International Drinking Water Supply and Sanitation Decade (1981-1990), some 250 million still remail unserved with water supply and 400 million without sanitation in urban areas alone. Most of them belong to urban low-income groups, the "urban poor", and continue to live in health-and life-threatening situations.

For a long time, investments in environmental infrastructure projects were influenced by the myth that the poor could not pay for the services. In reality, however, they were paying for more than their wealthier counterparts in the formal city but received much inferior services, e.g., water from vendors at exorbitant prices. Meanwhile, the provision of environmental infrastructure services has remained largely dependent on public investment and central government transfers to local authorities. In the absence of user involvement in the planning and provision of these services, relatively little attention is paid to ensure continued functioning of these services. According to one estimate, one in four water supply systems does not function at any one time and the number of those being abandoned is nearly equal to the number of new ones being commissioned. Even functional systems often remain in disuse. In some cases, two-thirds of the population, reported to have access to improved facilities, did not use them.

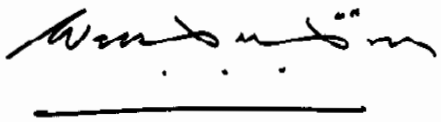
One of the factors that contribute to this situation is the general lack of information on how the communities secure water and sanitation, how much they pay for the services and how much the households are willing to pay for a better and more reliable service. In the absence of such information, infrastructure planning is usually based on assumptions made about the population to be served and per-capita consumption rates. In this top-down planning process, the tariff to be charged is usually calculated by supply-side considerations and focus on costs recovery without any realistic assessment of the affordability and willingness of the target consumers to pay for such services.

The present publication is part of the ongoing effort by UNCHS to support the implementation of Agenda 21 by enabling communities to effectively participate in service provision and management. The guidelines outlined in this publication rely on a participatory process to gather the necessary information and to mobilize the essential commitment of communities to pay for the services based on their ability and willingness. After extensive field trials, planned in 1996, these guidelines will be developed into a training manual for use by service agencies and communities.

The publication is an outcome of the ongoing UNCHS (Habitat) project aimed at developing and testing a Community-based, Environmental Management Information System (CEMIS) through field work in Accra (Ghana) and Jakarta (Indonesia). The project is being executed with financial support from Government of Denmark under the Environmental Health and Sanitation Component of the DANIDA-UNCHS Programme Agreement.

I hope the publication will be of practical use to professionals and decision-makers in governments and international agencies who are interested in pursuing a rational, demand-driven approach to the provision and management of environmental infrastructure services.

The contributions of Dr. Charles Surjadi and his team at Atma Jaya University (Indonesia), Prof. Christian M. Rogerson of the University of Witwatersrand (South Africa), Ms. Lynette Ochola of Oxfam (UK & Ireland) Kenya in contributing to the manual and Mr. André Dzikus of UNCHS (Habitat) in developing the framework for the manual and both supervising and substantively contributing to this publication are gratefully acknowledged.



Dr. Wally N'Dow
Assistant Secretary-General
United Nations Centre for Human Settlements (Habitat)

CONTENTS

LIST OF FIGURES, BOXES AND TABLES

List of figures

List of boxes

List of tables

1. INTRODUCTION

1.1. General Framework

It is now widely recognised that the success of an environmental infrastructure project largely depends on its dynamic interaction with the community. Time and again, it has been demonstrated that providing services to people that they do not want is unsustainable. This realisation has lead more and more development agencies to attempt to provide environmental infrastructure services around the "effective demand" of communities.

Effective demand can be difficult to characterize, as it is an expression of perceived needs and priorities of a community (GRET 1994). *For the purpose of these guidelines effective demand is defined as willingness and capability of a potential user to pay for an identified service as determined by the community itself.* This is based on the assumption that a community can fully participate in decision-making related to the planning, provision, operation and maintenance of environmental infrastructure services. However, to be in a position to carry out these functions, communities need access to unbiased information and preferably, generated by the community itself. Only this would enable communities to exercise independent decision-making, reflecting their true needs and abilities.

The focus of the present investigation is limited to low-income households and their perception of needs related to environmental infrastructure. As many households in low-income areas embark on informal sector activities, small-scale enterprises and urban cropping are also included in the document.

Chapter 6 of Agenda 21 defines environmental infrastructure as "water supply, sanitation, waste and drainage". For the purpose of demonstrating the application of these guidelines, the "water supply" component has been used as an example in this document. However, the guidelines are applicable to other components of environmental infrastructure as well.

It may be noted that this report does not purport to be a full training manual, but will be developed into one once it has been tested in the field. Users of this report are expected to be individuals or agencies who are interested in building capacity at local level to independently assess the effective demand of communities for environmental infrastructure. Users can be based in communities and community-based organisations, non-governmental organisations, local authorities, research institutions and multilateral agencies.

The introduction provides the reader with an overview of the framework for assessing effective demand. The framework consists of a number of modules which are further broken down into a number of steps suggesting a sequence of actions. The second chapter provides the findings of an indepth literature survey on "willingness-to-pay" and contains valuable background information on the state-of-the-art knowledge on the topic. Chapters three to eight cover the six modules for assessing effective demand. Each module outlines its objectives, outputs and the strategy for implementation, followed by action-steps required to achieve the outputs. Necessary background information and related practical examples are provided for each module in the main part of the guidelines.

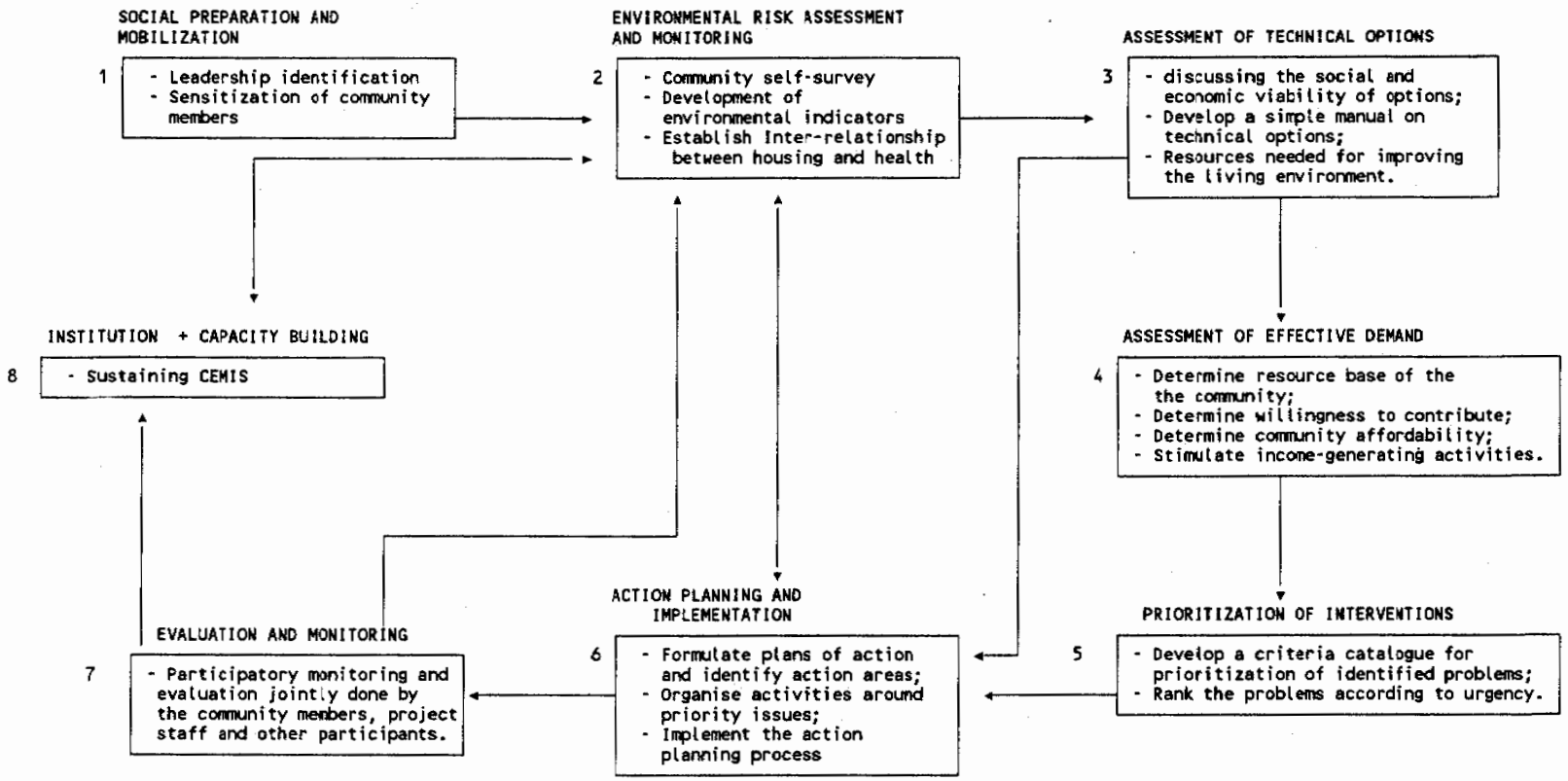
1.2 CEMIS Framework for Assessing Effective Demand

As part of its continuing effort to build capacity in communities, UNCHS (Habitat) has developed a Community-based Environmental Management Information System (CEMIS) which aims at providing community members and other actors with necessary information which they can utilize in planning, implementing and managing strategic interventions aimed at improving housing and environmental conditions in low-income human settlements. CEMIS has been designed on a modular basis. Figure 1 provides an overview of CEMIS modules.

The first module is **"community preparation and mobilization"** in which community leaders are identified. The expected output is an increased community awareness of the interrelationship between housing and environmental health.

The second module focuses on **environmental risk assessment and monitoring.** The communities, through self-assessment, are able to identify, prioritize and monitor human settlement conditions and related environmental health risks.

Figure 1: Framework of CEMIS (Steps to be followed in accomplishing CEMIS programmes)



The third is on the **assessment of technological options** in which communities are enabled to select appropriate technologies. Besides technical information, communities also need information on installation, operation and maintenance costs, environmental and health impacts as well as options on how to manage the technology.

The fourth is **"assessment of effective demand"** in which the resource-base of the community is determined by the community. It assesses the community's willingness and commitment to contribute towards specific interventions.

The fifth module is intended to enable communities to **prioritize human settlement interventions** based on the use of a criteria catalogue. The criteria catalogue includes information on the ranking of environmental problems and related strategic human settlement interventions. A further prioritization of human settlement interventions conducted based on available technological information and options, and available resources.

The sixth module is **"community action planning and implementation"** in which guidelines for planning, implementing and managing interventions are provided.

The seventh module is on **monitoring and evaluation.** This module provides tools for monitoring and evaluating human settlement intervention in communities.

The last module strives to **strengthen the institutional framework** developed by the project and the capacities developed to sustain CEMIS and the improved living conditions.

As CEMIS is a process oriented system, it covers a range of activities. It is considered however, that the modules on environmental risk assessment, technological options, effective demand and human settlement interventions are the core of CEMIS.

The following principles should be considered when developing CEMIS:

- CEMIS should be developed as an open-ended and flexible information and management system which can address the varying needs of its clients, thus the system will vary from place to place;

- CEMIS should be as simple as possible and only make use of technology appropriate to its clients;

- CEMIS should be a purely demand-driven system where the community operates the system to make decisions and appreciates its benefits.

The process of assessing effective demand is viewed as part of CEMIS, presented as CEMIS module IV. Figure 2 provides an overview of the framework of assessing effective demand. Prior to assessing effective demand, a community identifies and assesses available technological options and solutions for a specific environmental problem. In the case of water, this involves a review of different technologies related to water supply. Next to technical issues, the community will have to also familiarize itself with related costs of installing, operating and maintaining a selected technology.

Figure 2: Framework for Assessing Effective Demand

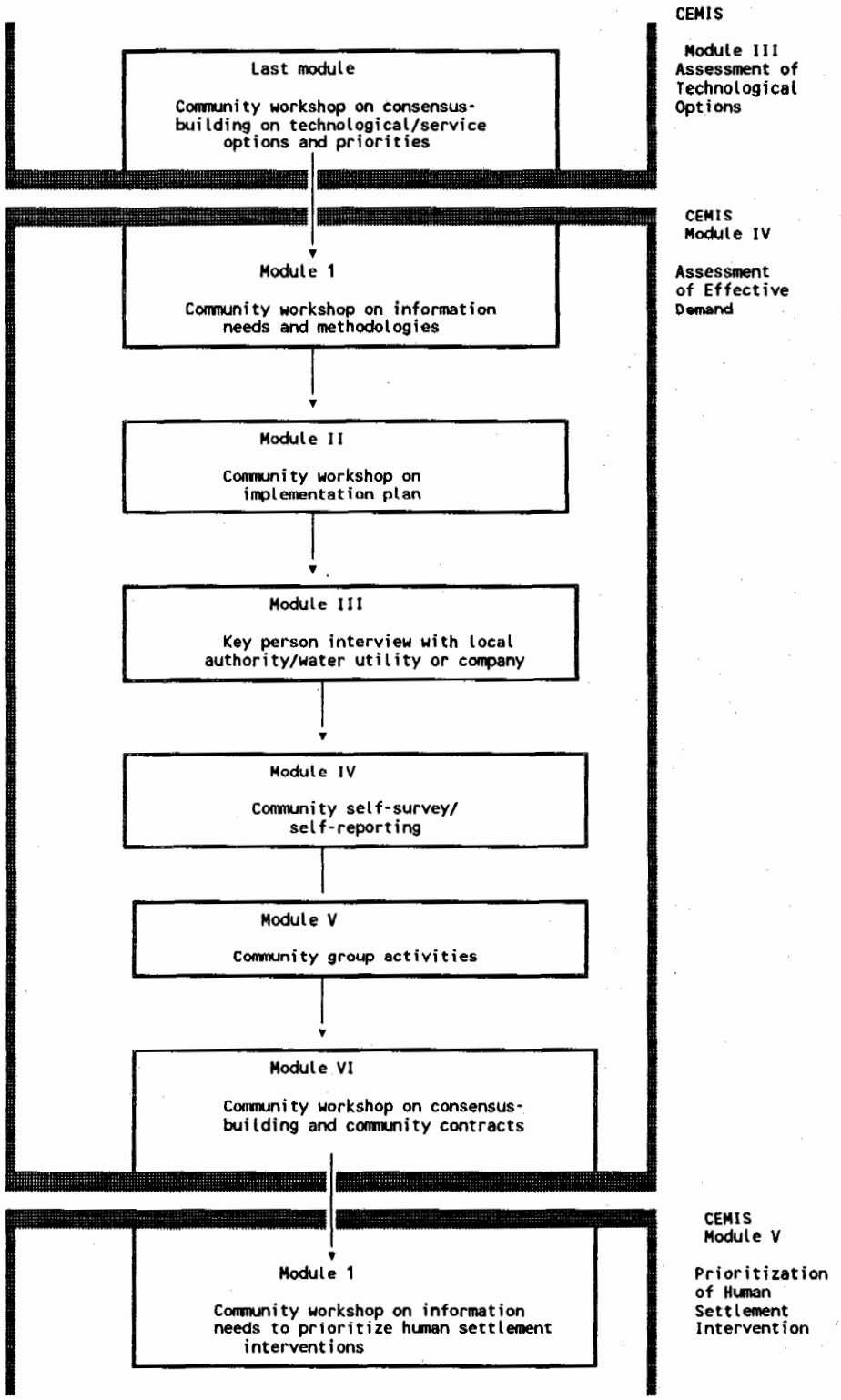
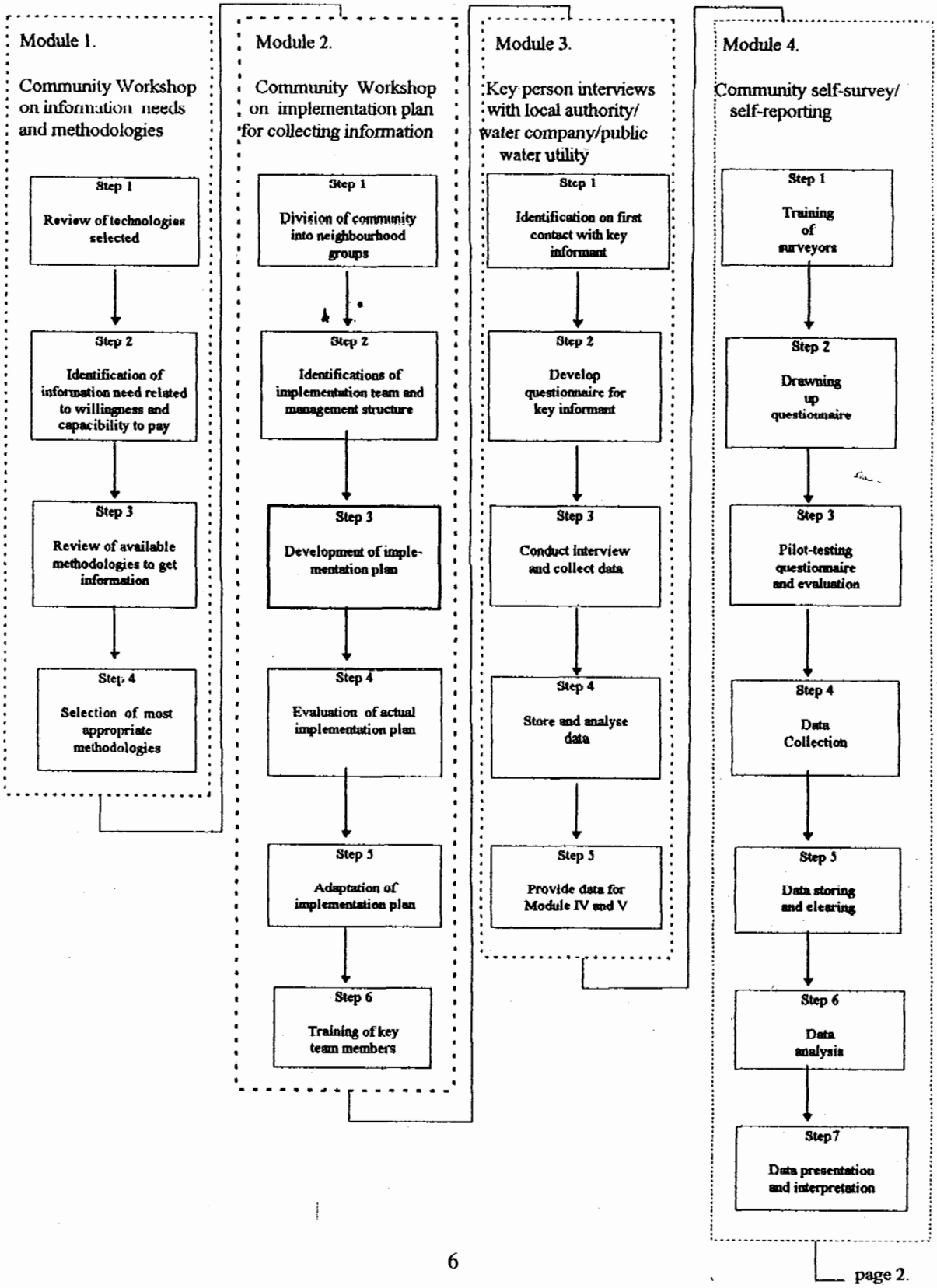


Figure 3: Detailed Framework for Assessing Effective Demand



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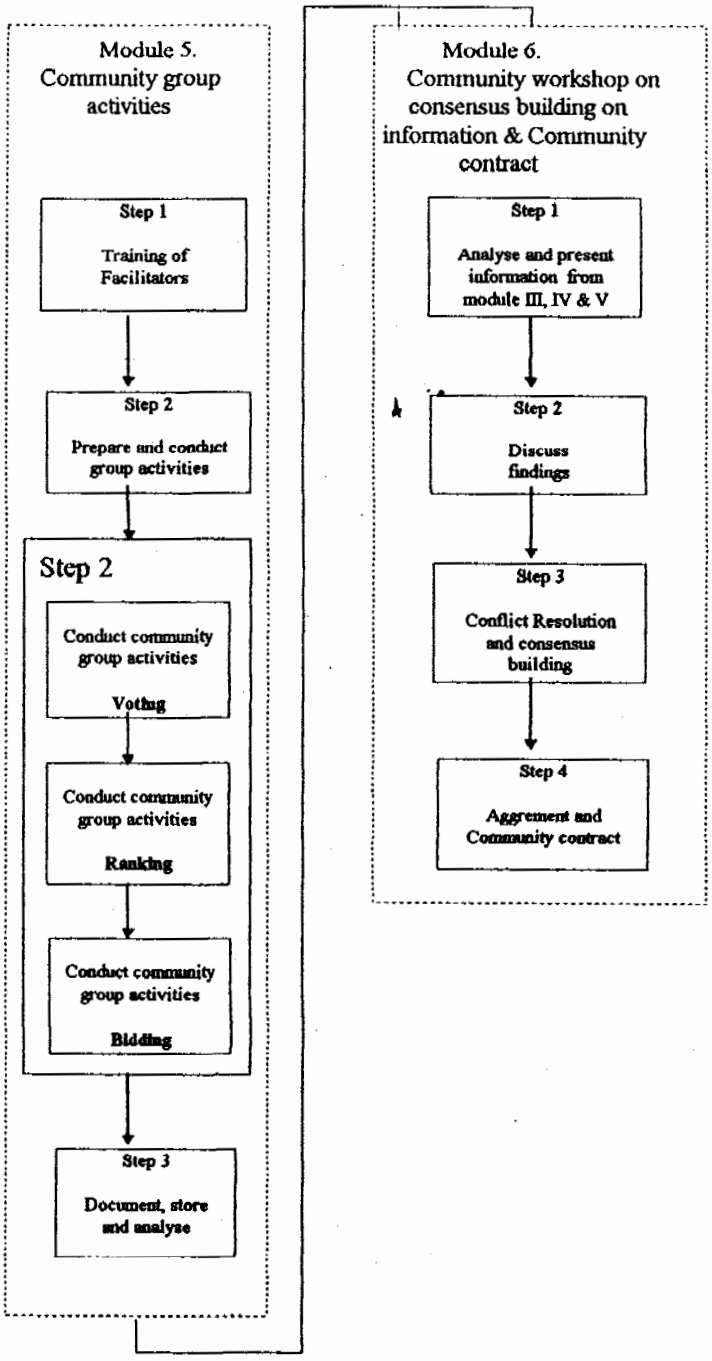

Module 5.
Community group activities
Step 1
Training of Facilitators
Step 2
Prepare and conduct group activities
Step 2
Conduct community group activities
Voting
Conduct community group activities
Ranking
Conduct community group activities
Bidding
Step 3
Document, store and analyse
Module 6.
Community workshop on consensus building on information & Community contract
Step 1
Analyse and present information from module III, IV & V
Step 2
Discuss findings
Step 3
Conflict Resolution and consensus building
Step 4
Aggrement and Community contract

It is from this point that the CEMIS module IV on assessing effective demand takes over. The CEMIS module on "assessing effective demand" is broken down into six modules as shown in chart 2 in the next page.

Module I on **information needs and methodologies** focuses on two aspects. The first step is to identify what type of information a community requires to ascertain the willingness and capability to pay for a preferred environmental infrastructure technology. The required information is heavily dependent on the preferred environmental infrastructure component and will vary accordingly. Secondly, there are different methodologies for acquiring the needed information. It should be noted that the methodologies should be simple enough to be operated by a community without major external inputs. Each method has its own strengths and weaknesses. For each environmental infrastructure component, a different combination of methodologies might be appropriate. During this part of the module, the community will further acquaint itself with the different methodologies and based on the information required, identify a combination of methodologies that are most appropriate.

Module II is on **developing an implementation plan** for assessing the required information with the help of identified methodologies. The community will embark on the details of developing a detailed implementation plan which will include sub-dividing the community into neighbourhood groups, identifying community leaders, volunteers and core-groups and their training needs, adopting a time frame for the data collection and mobilizing possible necessary resources for the data collection.

Module III focuses on conducting **interviews with key persons** or institutions such as the local authorities responsible for environmental infrastructure, public or private water utilities. A delegation nominated by the community in module II will visit all relevant institutions and conduct an interview to search for needed information. This exercise will also establish a close working relationship with relevant institutions so that these can also benefit from the information gathered by the community.

Module IV focuses on conducting a **community self-survey and self-reporting**. The community self-survey will be conducted at neighbourhood level and will be aggregated at a later stage. The self-survey will include direct interviews or observation and ranking which will be conducted by community volunteers.

Module V contains **community group activities** which will complement the information gathered in module IV. These group activities also include bidding games, ranking or voting.

Module VI **consensus-building and community contracts:** This module will gather the relevant information collected in modules III to V and present the findings to the community. The objective is to arrive at a consensus on who is willing to pay how much for which technology or service. This module will also attempt conflict resolution amongst disagreeing groupings concerning preferred technology and related ability and willingness to pay. This module will result in community contracts, following which the human settlement interventions will be implemented during the following modules of CEMIS.

2. BACKGROUND: ASSESSING EFFECTIVE DEMAND

2.1. Summary

For a long time planners and city managers have considered that the less fortunate sections of our society, the urban poor, are unable and unwilling to pay for infrastructure services such as water supply. This perception has been proved to be wrong by research findings in slums and squatter settlements which clearly established that the urban poor are paying **10 to 100 per cent more for far inferior services** than their counterparts in the formal parts of the city (UNCHS 1991). This has led to a rapidly-growing body of research literature on willingness to pay for water.

Box 1: Differentials in the cost of water (ratio of price charged by water vendor to prices charged by public water utility

City	Price ratio of water from private vendors: public utility
Abidjan (Cote d'Ivoire)	5:1
Karachi (Pakistan)	83:1
Lagos (Nigeria)	10:1
Lima (Peru)	17:1
Nairobi (Kenya)	11:1
Port-au-Prince (Haiti)	100:1
Surabaya (Indonesia)	60:1

Source: extracted from World Bank (1988)

A survey of the international "state-of-the-art" on willingness to pay in 1994 conducted by UNCHS (Habitat) revealed that there were some 20 substantive studies on the topic. The detailed findings of the literature review can be found in the next chapter. The majority of the available studies have emanated from research work sponsored by the World Bank, or other development agencies. In a bid to overcome the lack of adequate data and knowledge on households' willingness to pay for water, two main methods have emerged.

The first, direct method, builds on rapid appraisal survey methods assessing what consumers already pay for water. In this respect, surveys of water-vending practices promise particularly rich sources of information. In addition, there has been a renaissance of household questionnaire studies on the water sector. Contingent valuation studies (bidding games asking people what they would be prepared to pay for improved services in future) are proving useful.

The second, indirect method aims at establishing what those living in similar circumstances to the target population are already paying for water, (Evans 1992, UNCHS 1994).

All approaches have improved considerably in recent years. However, they all have one drawback in common. They are heavily dependent on external resources to generate information on households' willingness to pay for water. In addition, they are not truly participatory. A critique of these methodologies would be based on a range of biases linked to their "external" nature:

- Hypothetical bias:individuals do not understand the services described by the interviewer;
- Strategic bias: respondents may think that they can influence the provision of services by not answering truthfully;
- Compliance bias: respondents may give answers to please the interviewer.

One way of avoiding these biases is to enable communities to assess their effective demand for water themselves through community self-surveys and community workshops. This would reduce a community's need for external inputs and dependencies -- and will ultimately lead to community empowerment and self-determination. It would also mobilize locally-available information and resources. The concept is built on principles of assessing the willingness and ability of households to contribute or pay for services as determined by the community. In addition, community consensus would be established on firm commitments to contribute to improved services.

2.2. An International Literature Review

2.2.1 Introduction

The period 1981-1990, the International Drinking Water Supply and Sanitation Decade, was characterized by sustained efforts on the part of communities, governments and several international development agencies to expand water supplies and sanitation facilities particularly to the poorest populations in the developing world. It has been claimed that the efforts of the development agencies, participating in the Decade, spearheaded by the World Bank, were "enthusiastic, often innovative, and sometimes outstandingly successful" (Cairncross, 1992, p. 1). Nevertheless, it is admitted that "some of the more optimistic Decade targets have not been achieved" and cautioned that "much remains to be done before safe water and sanitation are available to all" (Cairncross, 1992, p. 1). Although the majority of developing world countries and support agencies subscribed to the goals of the Decade, overall objectives were not met. Especially troublesome was the fact "that improvements in sanitation lagged far behind those in water supply" (Whittington, Lauria, Choe, Hughes, Swarna and Wright, 1993, p. 733). The inadequate provision of water services was the catalyst for the emergence of popular movements in certain parts of the developing world, most notably in Latin America (see eg Bennett, 1989).

What is clear is that during the Decade major progress was made in terms of advancing knowledge in the technological issues surrounding water supply or sanitation provision. Several studies appeared, for example, analysing such issues as conventional and non-

conventional technologies of water supply or sanitation, including handpumps and VIP latrines (see Reynolds, 1992; Ridgley, 1989, 1993). Indeed, in many respects, it remains that the Decade's "most important achievements have been in the realm of ideas" (Cairncross, 1992, p. 1). Accordingly, it is evident that the principal challenges of the next decade "will not be technological questions - the "hardware of water supplies and sanitation" - but the "software" issues" most notably questions relating to the organization and financing of water or sanitation programmes. One key software issue concerns the issue of household and community "willingness to pay" for water supplies or sanitation. The principal lesson of the Decade is perhaps that progress and continuing success hinge upon responding to consumer demand; a first step in that response is to understand household or user willingness to pay (Cairncross, 1992, p. v).

The objective in this section is to furnish a synthesis on current international writings concerning "willingness to pay". Given that user willingness to pay for facilities is often a major part of the cost of a water or sanitation supply scheme it is remarkable how little detailed literature exists as regards user willingness to pay (Cairncross, 1992, p. 35; McPhail, 1993, p. 963). An intensive scan of the international 'state of the art' discloses less than twenty substantive studies either completed or currently in progress on questions surrounding willingness to pay. The majority of these available studies have emanated from research work sponsored by the World Bank or other development agencies, such as USAID. In terms of this development agency led research, the most notable studies have been the stream of works associated with Whittington and, to a lesser extent, Briscoe. Only recently have there appeared a scatter of studies undertaken by independent scholars or analysts concerning this issue (eg Blore, 1989; Schur, 1992; Freiman, 1994; Goldblatt, 1994). In synthesizing this body of international material the review is organized in terms of four sections of material. First, the importance of understanding "willingness to pay" is emphasized, particularly in terms of the planning of water projects. In the second section, the focus turns to review the contributions and validity of rapid reconnaissance surveys of the business of informal water vending; it is argued that such studies can yield valuable insights into community willingness to pay. The third section investigates the methodology and findings of what must be seen as the cutting edge of 'willingness to pay' research. More specifically, the focus is upon critical analysis of the methodology of willingness-to-pay or, as sometimes called, contingent valuation studies. The final section draws together conclusions and re-iterates the key findings of this review.

2.2.2. Willingness to Pay: The Significance of the Issue

It is argued by Whittington, Lauria and Mu (1991, p. 179) that for most water utilities and donor agencies, the actual water supply and sanitation situation in the developing world "is typically something of a mystery" with scant knowledge of the means by which households secure water, its use, cost or how much households might be willing to pay for improved services. In a recent contribution, Crane (1994, p. 71) avers that information "regarding the demand for water by the urban poor, including the amount they pay, where they find it, and how they would react to change in either prices or supply structures, remains relatively scarce". Nevertheless, this paucity of knowledge has not blocked major investment planning for the water supply sector. Indeed, it is observed that "designs for new systems are generally made and projects constructed with little understanding of household water demand behaviour" (Whittington, Lauria and Mu, 1989, p. 1). Moreover, "the behavioural response

to any given policy intervention has only infrequently been incorporated into infrastructure investment and administrative reform plans" (Crane, 1994, p. 71). Instead, "engineers and planners tend to rely on very simplistic assumptions about what determines per capita water use and affordability" (Whittington, Lauria and Mu, 1989, p. 1).

The situation in terms of the provision of associated sanitation facilities is equally depressing, if not worse. One World Bank research study concluded that across the developing world "the practice of sanitation planning has become a kind of routine, cookbook-style exercise that is out of touch with the realities that massive subsidies are unavailable and that the needs of the poor are not being met" (Whittington, Lauria, Wright, Choe, Hughes and Swarna, 1992, p. 2). It was argued that in "traditional sanitation planning, piped sewerage is usually selected as the technology of choice, and the focus of planning is largely on "supply-side" issues such as estimating the costs of constructing and operating the proposed system" (Whittington, Lauria, Choe, Hughes, Swarna and Wright, 1993, p. 733). These authors continue that little attention is "paid to consumer demand for sanitation because it is typically assumed that either everyone will want to connect to the sewerage system at whatever price is charged or public health benefits are so important to the community and the service will be so heavily subsidized that no one will have reason not to connect" (Ibid, p. 734). The result is that the present planning system for sanitation in many areas of the developing world has produced the "construction of numerous systems that people cannot afford to connect to and are thus not being used" (Ibid, p. 734). What is required are new planning procedures "that consider the demands of the beneficiaries" (Whittington, Lauria, Wright, Choe, Hughes and Swarna, 1992, p. 3).

If water and sanitation projects in the developing world were usually financial and social success stories then it could be argued that there is no point in pursuing detailed research concerning household water-use behaviour. Regrettably, this is seldom the case (see Lauria and Whittington, 1989; Briscoe, de Castro, Griffin, North and Olsen, 1990; Lovei and Whittington, 1991; Rondinelli, 1991). As argued by one research team: "water supply systems provide a low level of service (usually through public taps or hand pumps); they are heavily dependent on (often unreliable) government investment financing and transfers for operations and maintenance expenses; and the quantity and quality of service are unreliable" (Briscoe, de Castro, Griffin, North and Olsen, 1990, p. 116). Moreover, commonly, "the "improved" systems often do not function; it is estimated that one in four systems is not working at any one time, and that the number of systems being abandoned is approximately equal to the number of systems being commissioned" (Ibid, p. 116). Even functioning water systems are not always used; for example in Cote d'Ivoire and Kenya surveys have revealed that "only one-third of the population reported to have access to improved facilities actually used them" (Ibid, p. 116).

For a variety of causes, water supply projects commonly fail to reach their anticipated goals. In cities "water schemes often fail to achieve the goals set for the number of households to be connected to the water system, the amount of water produced, and the proportion of costs recovered - and the gap between expectations and accomplishments is often great" (Whittington, Lauria and Mu, 1991, pp. 179-180). One of the key reasons behind these shortfalls of urban water projects is "lack of adequate data on household water demand" (Whittington, Lauria and Mu, 1989, p. 1). In rural areas of the developing world a similar picture is sketched. A World Bank team of researchers argue that progress "in improving the

quality and quantity of water used by people in rural areas of the developing world has been unsatisfactory in two respects: (1) supplies that have been built are frequently neither used correctly nor properly maintained and (2) extension of improved services to unserved populations has been slow" (Whittington, Briscoe, Mu and Barron, 1990, p. 293). Once again, it must be cautioned that this poor record of rural water projects is the product of a complex of factors; nonetheless, "a major impediment to improved performance is inadequate information on the responses of customers to new service options" (Ibid, p.293). Indeed, the international experience underscores the fact that there are "obvious dangers in designing rural water supply systems without reasonable information on what services people want and for what they are willing to pay" (Briscoe, de Castro, Griffin, North and Olsen, 1990, p. 117). Moreover, the design of water supply projects in rural parts of the developing world has been overly supply-oriented to the neglect of crucial considerations concerning consumer demand, more particularly, of consumer willingness to pay (World Bank, 1987; Altaf, Jamal and Whittington, 1992).

In planning water projects in urban or rural areas, water utilities, donor agencies and resource planners are obliged to determine the percentage of household income that residents are able and willing to spend for individual potable water connections and subsequent commodity charges. Such information is typically applied to the planning of water distribution systems, their sizing and to financial planning of projects. As Mc Phail notes, despite the significance of having a reasonable estimate of this percentage to avoid either over- or underbuilding the physical works or setting the water tariffs too high or too low, "there are very few empirical studies that explore the level of household income or expenditures that households will dedicate for improved water service connections and the ongoing volumetric charges" (McPhail, 1993, p. 963).Indeed, in many instances, demand for water at different prices "is not considered during the design of piped water systems" (McPhail, 1993, p. 963). Instead, planning is undertaken on the basis of general sets of assumptions made about the population to be served and per capita consumption rates. Tariffs to be charged are calculated so that they cover the necessary operating, maintenance and percentage of capital costs. Seldom is any consideration accorded to whether tariffs reflect the general community's willingness to spend. In rural projects the behavioural assumptions that underlie most water supply planning are generally crude. Normally, it is assumed "that so long as financial requirements do not exceed 5% of income, rural consumers will choose to abandon their existing water supply in favour of the "improved" system" (Whittington, Briscoe, Mu and Barron, 1990, p.293). The assumptions relating to urban water supply are almost identical; most utilities as well as donors "assume that, as long as the cost of potable water to the household falls below 5% of household income, then it is "affordable" and the household will make a connection to the system and be able to pay the subsequent recurrent charges" (McPhail,1993, p. 963). Water project planning is therefore based on twin assumptions of (a) a very inelastic demand as long as the amount spent on water is below 5% of household income; and (b) very elastic demand if the outlay exceeds 5 % of household income.

Experience of water projects undertaken in many parts of the developing world shows that this "five percent rule" is often incorrect both in terms of urban and rural areas.In the rural developing world "many of those "served" by new systems have chosen to continue with their traditional water use practices" (Whittington, Briscoe, Mu and Barron, 1990, p. 293). In many instances, such as the experience of rural Zimbabwe, "facilities are built for which

a community would never pay" (Briscoe, de Castro, Griffin, North and Olsen, 1990, p. 117). Further, in urban areas, another problem is "that many people who desire and are willing to pay for improved water service are not even considered for piped water service because they are mistakenly thought to be indigent" (McPhail, 1993, p. 963). Commonly, the untested 'rule of thumb' method produces different behavioural assumptions on the behalf of donors and governments. For donor agencies eager to promote new technologies or systems, "the temptation is to overestimate the willingness of consumers to pay" (Cairncross, 1992, p. 35) often with staff assuming that the ability to pay a certain amount is equated with a willingness to do so. By contrast, national governments are more likely to under-estimate the willingness to pay, particularly of low-income groups. It is conjectured that one possible motivation for this is that in negotiations with donor agencies "it may help to secure a higher level of external funding for the sector" (Cairncross, 1992, p. 36).

In sanitation planning the general rule of thumb is that "if the monthly charges are less than 3 percent of household income, it is often assumed that the household has the ability (and willingness) to pay for the improved service" (Whittington, Lauria, Wright, Choe, Hughes and Swarna, 1992, p. 2). As is the case with water projects, however, this simplistic assumption increasingly is being called into question. Indeed, "evidence is accumulating from developing countries that the traditional kind of master planning exercise is not a productive way to analyze urban sanitation problems or to plan for improvements" (Ibid, p. 2).

Overall, therefore, the lessons and experience gained from water and sanitation projects implemented in the developing world over the past two decades is clear that a strong case exists for understanding and estimating user willingness to way. Empirical works, it is argued, can strengthen the planning and delivery of water and related sanitation projects, especially to the poorer communities in both the urban and rural areas of the developing world. As noted by one set of observers, researchers confront the challenge "to identify, under a range of socioeconomic and environmental conditions, the level of service that people want and for which they are willing to pay" (Briscoe, de Castro, Griffin, North and Olsen, 1990, p. 116).

2.2.3 Estimating Willingness to Pay: The Contribution of Water Vending Surveys

Cairncross (1992, p. 36) stresses the value for the water supply sector of conducting surveys of how much people already pay for water. One readily available source of information concerning willingness to pay derives from pursuing surveys of organized and informal water vending activities both in cities and rural areas. It is often forgotten that millions of people in villages and cities throughout the developing world are served by water vendors who take water from an available source and subsequently deliver it in containers to households or fill household containers from their vehicle tanks (Zaroff and Okun, 1984). Indeed, the poorest urban informal settlers are often driven to rely on water vendors because of the lack of convenient standpipes, itself "often a consequence of government policy not to provide infrastructure in 'illegal' unplanned squatter areas" (Cairncross, 1987, p. 181). Illustratively, in Jakarta, roughly 32 percent of the city's 8 million inhabitants are purchasing drinking water from street vendors (Lovei and Whittington, 1991, p. 2). Nevertheless, with only a few exceptions, "water vending has received little attention in the published literature" on water issues or in the considerable body of research on the informal economy in the developing world (Whittington, Lauria, Okun and Mu, 1989, p. 160). The benchmark study remains the

comparative survey of vending practices in Asia, Africa and Latin America by Zaroff and Okun (1984).

The activity of informal water vending has both advantages and disadvantages to poor communities in the developing world. On the negative side, the distribution of water by vendors is expensive, irrespective of whether vehicles are powered by people, animals or engines (Crane, 1994). In addition, it is generally the case that households served by vendors pay higher charges for water than those directly connected to a piped water system. In many cases, households pay over 10 percent of their monthly incomes for vended water as compared to figures of between 1-5 percent of monthly income for piped water. In Jakarta, Indonesia, Lovei and Whittington (1991, p. 24) concluded that there "can be no doubt that the prices households pay for water from distributing vendors are very high"; in some cases, households "purchasing from vendors pay as much as 50 times more per unit of water than households connected to the municipal system" (Lovei and Whittington, 1991, p. 9). Moreover, research conducted in rural Tanzania recorded that villagers in the Newala District must either buy water from vendors at a high cost or fetch water from traditional sources (Whittington, Mujwahuzi, McMahon and Choe, 1989). When they must purchase water from vendors, "some villagers pay the equivalent of up to one day's agricultural wages for a 20 litre bucket" (Rondinelli, 1991, p. 421). The high relative cost of water on both a unit and monthly basis was a theme further emphasized in the international comparative survey of Zaroff and Okun (1984).

Beyond cost considerations, vending sometimes is linked to health problems as hawkers may sell from polluted sources or from fouled containers (Zaroff and Okun, 1984). Finally, one should not lose sight of the fact that, in many cities where water vending takes place, the vendors themselves are employees rather than 'independent entrepreneurs' and, as has been shown in the case of informal settlements around metropolitan Durban, subject to highly exploitative wage and working conditions (see Hill, 1991, p. 60).

Positive features of water vending are that it furnishes a valuable service for communities in urban and rural areas with no access to piped water; in the latter case, providing some relief from the drudgery of carrying water from often distant sources to the household. Accordingly, the major benefit of water vending to the consumer is "that it provides a significant saving of time compared to fetching water from other sources" (Whittington, Lauria, Okun and Mu, 1989, p. 159). Other positive features of water vending as an informal activity concern its labour-intensiveness and thus job creation impact and the fact that the simple technologies of water vending systems can be readily maintained on a local basis.

Important research conducted for the World Bank on water vending both in Kenya and Nigeria shows that "the scale and magnitude of vending activities in metropolitan areas of developing countries has not been widely realized, nor has the value of information on such vending systems been adequately appreciated by water resource engineers or policy analysts" (Whittington, Lauria and Mu, 1991, p. 194). It has been demonstrated that information on water vending practices may provide valuable inputs to water supply planning, not least concerning some insight on willingness to pay. This group of Bank researchers have demonstrated that rapid reconnaissance surveys of water vending can furnish "policy-relevant information to water utility managers in a timely fashion" (Whittington, Lauria and Mu, 1989, p. 1), yielding "valuable information for water supply planning" (Ibid, p. 25). The

findings and implications of the two notable studies dealing with respectively, Ukunda in Kenya and Onitsha in Nigeria will be examined in turn.

The research in Ukunda, a village situated some 40 km south of Mombasa, uncovered the workings, organization and actors in the water vending system (Whittington, Lauria, Okun and Mu, 1989; Whittington, Mu and Roche, 1990). Essentially, many people in Ukunda obtain water "by purchasing it from direct vendors who are licensed operators (kiosks) or from distributing vendors who buy water from the kiosks (wholesale vendors); vendors carry water in 20 litre plastic containers which are transported either by carts or bicycles (Whittington, Lauria, Okun and Mu, 1989, p. 160). Overall, the research disclosed that water vendors "supplied 45% of the total water consumed in Ukunda" (Ibid, pp. 162-164) with annual expenditures per capita on water being in the range of US $30. More significantly, it was calculated that the average per capita water expenditure for vended water "is about 9% of the average annual per capita income in Ukunda" (Ibid, p. 164).

In terms of the question of 'willingness to pay' for water, the research at Ukunda on the magnitude of money and water flows in the water vending system demonstrates "that most people in Ukunda can afford yard taps or even house connections" (Ibid, pp. 164-165). At Ukunda "households are paying much more for vended water than would be necessary to provide and sustain a piped distribution system with yard taps" (Ibid, p. 168).Indeed, the key conclusion is that average annual per capita expenses on vended water "can serve as a useful indicator of a community's ability and willingness to pay for a piped distribution system" (Ibid, p. 165). Moreover, the "fact that yard taps do not already exist throughout Ukunda indicates an inability on the part of the community or water authority to mobilize resources, not an inability or unwillingness of the population to pay the cost of the improved service" (Ibid, p. 165). Finally, the findings from Ukunda underscore that the methodology of undertaking surveys of water vending can furnish vital planning information in terms of indexing a community's capacity and willingness to pay for a piped system (Ibid, p. 168).

The study in Onitsha, Nigeria broadly parallels that in Ukunda in terms of approach, methodology and research focus. The city of Onitsha, contains some 700,000 inhabitants, but with only roughly 8000 households connected to a public water supply system. The research team showed that the "vast majority of the population obtains its water from the vending system which has been created and is operated by the private sector" (Whittington, Lauria and Mu, 1991, p. 181). The city's water vending system is elaborate and well-organised (Whittington, Lauria and Mu, 1989, p. 4). Once again, as in Ukunda, the researchers sought to size the magnitude and costs attached to the water vending sector, recognizing seasonal variations.The water vending sector in Onitsha displayed certain features that were at variance with observations previously made in other centres. Most importantly, whereas in other areas of the developing world water vending was found to be a competitive industry in which the prices of vended water were determined by market forces, such that vendors were not making 'excessive profits', this was not the case in Nigeria. In Onitsha the drivers of water tanker trucks were found to "be making extremely high rates of return on their capital investment" resulting in high water charges to consumers (Whittington, Lauria and Mu, 1991, p. 165). Recent research from Indonesia confirms that the ability of "vendors to earn excessive profits is limited only by the availability of close substitutes for the services they offer" (Crane, 1994, p. 74). Nonetheless, it was particularly the poorest households in Onitsha who were discovered to be paying most for water "both in absolute amounts and in

terms of the percentage of their income spent on water"; the lowest income groups of households were estimated "to be paying 18 percent of their income on water during the dry season" as compared to between 2-3 percent for upper-income households (Ibid, p. 189). This extraordinarily high figure should be contrasted with the common assumption of 'rule of thumb' analysis that households in the developing world would afford only 3-5 percent of their income for improved water supplies.

Again, the Onitsha research underscores the validity of undertaking research on the workings and mechanics of the water vending sector. Indeed, the authors go so far as to claim that the Onitsha findings put "the policy debates over whether the poor can afford water and whether water should be provided as a subsidized public service in a somewhat different perspective" (Whittington, Lauria and Mu, 1989, p. 23). It is calculated that Onitsha households, who were paying in total an annual amount of US $7 million to water vendors, were "already paying water vendors over twice the operation and maintenance costs of a completed piped distribution system, and 70 percent of the total annual costs" (Ibid, p. 23). Such findings underscore the important conclusion that "to argue that the population in Onitsha cannot afford to pay for water is clearly erroneous" (Ibid, p. 23). Lastly, the Onitsha research, once more, re-inforces the utility of rapid reconnaissance surveys of water vending systems to yield valuable policy and planning information concerning willingness to pay for water (Whittington, Lauria and Mu, 1991, p. 194).

2.2.4 Contingent Valuation Surveys: Method and Findings

The leading edge of international research on willingness to pay for water services is constituted by a body of works which have applied the methodology of contingent valuation studies. Such research seeks to enhance the concept of willingness to pay through a direct survey approach whereby interviewers pose questions within the context of a hypothetical market. Essentially, contingent valuation studies "are simply household surveys in which a member of a household is asked a series of structured questions designed to determine the maximum amount of money the household is willing to pay for a good or service" (Altaf, Jamal and Whittington, 1992, p. xiii).

An essential aspect of the method is use of bidding games to determine willingness to pay. Very simply, consumers are asked in sequence whether they would be prepared to pay say $10, $20, $50, $100 and so on until a price is reached which they are unwilling to meet (Cairncross, 1992, p. 37). The basic form of the bidding game is to ask "If you were required to pay X per month for a connection, would you choose to connect to the system or would you prefer to use the alternative source?". Each household is asked this question across a range of tariffs with the sequencing of bids starting at extremes (the lowest or highest value to be asked) and then converging inward. Thus, if the prescribed values were 50, 100, 150 and 200 Kenyan Shillings, the order would be (for a low starting point): 50, 200, 100, 150.

Until the late 1980s social researchers generally counselled against the application of such an approach asking users how much they would be prepared to pay using a basket of hypothetical options (Cairncross, 1992). It was suggested that poor and illiterate populations might find it difficult to understand hypothetical situations or biased answers might eventuate if respondents sought to manipulate surveys to their advantage. Indeed, such surveys were

deemed widely unreliable "due to the pervasive feeling that interrogated responses by individuals to hypothetical propositions must be, at best, inferior to 'hard' market data or, at worst, off-the-cuff attitudinal indications" (Cummings, Brookshire and Schulze, 1985, p. 50). Most damning was the conclusion of a World Bank review of water demand studies using such hypothetical questions in the late 1970s, in which it was stated that the approach had been shown as "virtually useless" (cited in Briscoe, de Castro, Griffin, North and Olsen, 1990, p. 119). As other observers, however, have pointed out there was "little empirical evidence to support this conclusion" (Whittington, Briscoe, Mu and Barron, 1990, p. 294).

The core criticism was that for a variety of reasons "respondents may not answer willingness-to-pay questions accurately and thus not reveal their "true" willingness to pay" (Whittington, Briscoe, Mu and Barron, 1990, p. 297). In particular, three problems were isolated with the approach of contingent valuation studies. First, was the issue of hypothetical bias, which arises from individual's inability to understand or correctly perceive the characteristics of the service being described by the interviewer. Second, strategic bias "may arise when an individual thinks he may influence an investment or policy decision by not answering the interviwer's question truthfully" (Whittington, Briscoe, Mu and Barron, 1990, p. 297). Finally, compliance bias may emerge through respondents giving answers which are influenced by a desire to please the interviewer (Briscoe, de Castro, Griffin, North and Olsen, 1990, p. 119).

Since the late 1980s the methodology of contingent valuation surveys has been experiencing a revival, if not a renaissance in water research. Behind this revival are a set of significant conceptual and empirical advances for conducting such contingent valuation surveys and overcoming their potential pitfalls. It is now generally "acknowledged that the major sources of bias can be addressed" (Ibid, 1990, p. 119). As elaborated by a World Bank team of researchers:

First, where the hypothetical service to be introduced is not well known to the community (seldom a problem with water supplies)information can be provided through pictures, films and discussions so that the nature of the service is clear. Second, it is possible to assess the magnitude of strategic biases through the use of a variety of techniques, such as choosing settings which would encourage or discourage strategic behaviour, and comparing the effects of, say, family characteristics derived from contingent valuation and 'indirect' methods. And, third, through careful recruitment and training of interviewers, compliance biases can be minimized (Ibid, 1990, p. 119).

As a result of its wider acceptance as a methodology for evaluating the benefits of environmental improvement, in 1987 the World Bank initiated a multi-country study of willingness to pay for water using contingent valuation surveys. Additional research was sponsored by other development agencies as well as undertaken by independent scholars. Attention turns now to examine the core findings of this international body of writings.

The most important and consistent set of findings in all the studies undertaken across both rural and urban settings relates to the applicability of the contingent valuation survey methodology to water research. For example, in research undertaken in rural Haiti, it was asserted that "the preliminary results of this research strongly suggest that contingent valuation surveys are a feasible method for estimating individuals' willingness to pay for

improved water services" (Whittington, Briscoe, Mu, and Barron, 1990, p. 309). Further, it was observed that "respondents took the contingent valuation questions, and indeed the entire interview quite seriously" (Ibid, 1990, p. 302). The application of bidding games was seen as particularly fruitful. The World Bank team felt that "we never received wildly unrealistic or "protest" bids" and that overall, "the bidding-game question format worked better than the direct, open-ended questions" (Ibid, p. 302). Furthermore, it was averred that interviewees "generally felt more comfortable with the bidding games, and, in fact, our enumerators remarked that the bidding game format was very familiar and easily understood because it was similar to the ordinary kind of bargaining that goes on in local markets of rural Haiti" (Ibid, p. 302).

In concluding their evaluation of the application of contingent valuation surveys, the authors of the Haiti study were unequivocal in their endorsement of the validity of this research method. They stated that "the results of this study suggest that it is possible to do a contingent valuation survey among a very poor, illiterate population and obtain reasonable, consistent answers" (Ibid, p. 307). The World Bank team expressed the view that the often cited difficulties of contingent valuation studies, such as hypothetical bias, were not a major problem. Less conclusive, however, was the evidence regarding strategic bias; nonetheless, the tests for such bias and the experience of enumerators both suggested that it could be discounted. It was admitted that the research could not enable a water agency to determine whether individuals in the villages of rural Haiti would in fact pay the amounts indicated in the contingent valuation survey if the agency actually tried to collect the money. In order to achieve this aim what would be required would be "to conduct a contingent valuation survey in a village before a water system is built, then resurvey after the system is completed and collection efforts are made, and compare the prior bids with actual behaviour" (Ibid, p. 308).

A second successful example of the application of contingent valuation surveys to rural water supply questions is that undertaken for the World Bank in the rural Punjab, Pakistan. This study of willingness to pay was carried out in three different environmental settings, *viz.*, a sweet water zone where good quality water is readily accessible and where the official policy is to furnish public facilities; a brackish water zone where groundwater is freely available but of poor quality and where piped water supply systems with household connections are sanctioned for villages with over 5000 population; and, an arid zone where groundwater is of good quality, albeit difficult to access (Altaf, Jamal and Whittington, 1992). One of the objectives of this investigation was to determine the willingness of households to pay for improved service levels. The empirical findings showed the validity of contingent valuation surveys as opposed to rule of thumb analysis of willingness to pay. Once again, the credibility of the willingness to pay bids was tested (Ibid, p. 12) and felt to be solid (Ibid, p. 82). The results indicated that the amount of money that rural Punjab households were willing to pay for improved water supplies as a percent of household income was considerably lower than assumed (Ibid, p. 81). More specifically, spatial variations occurred across the three groundwater zones; in the sweet water zone the mean willingness to pay bid was only 1.1 percent of household income, in the brackish zone respondents recorded a 2.4 percent level of household income and the highest figure was for the arid zone (3.5 percent). The important point is that these estimates are "still well below the 5 percent rule of thumb often used to estimate how much households will pay for improved water supplies" (Ibid, p. 81). Explanations for these geographical variations in willingness to pay bids were located in the fact that the low bids in the sweet water zone were "because unreliable public water

systems are much less attractive when good quality water is easily available from private handpumps" (Ibid, p. 82).

A third convincing application of contingent valuation surveys to rural water supplies is contained in work on rural Brazil (Briscoe, de Castro, Griffin, North and Olsen, 1990). This particular study demonstrated that surveys on actual and hypothetical water use practices (applying contingent valuation surveys) can furnish crucial policy-relevant information on willingness to pay, which was revealed as varying according to household socio-economic characteristics and the characteristics of existing and new supplies of water. In greater detail, the findings disclosed that "tariffs for yard taps can be increased very substantially before significant numbers of households would choose not to connect to an improved system" (Ibid, p. 133). Such increases in tariffs for yard taps, it was argued, "would both improve the financial viability of rural water supply schemes and reduce the subsidies that the better off receive through highly subsidized rates" (Ibid, p. 133). Lastly, the study also showed that the rural poor could be protected by provision of free water at public taps without jeopardizing the financial viability of schemes.

In terms of methodology, the findings of this particular study again reinforce the case for contingent valuation research studies. Initially, it was admitted that the research team "were sceptical of the notion of bidding games but, after a few days of field testing, were convinced not only that the logic of the procedure was understood by respondents but that respondents gave serious and thoughtful answers" (Ibid, p. 128). This particular study showed that whilst an element of strategic bias might be present in the findings they were confident that no hypothetical bias was indicated. Overall, the authors were certain in the Brazilian study that the "principal methodological question addressed by the study can be answered affirmatively" (Ibid, p. 133). Specifically, it was strongly asserted that "well-designed and carefully administered surveys of actual and hypothetical water-use practices can provide consistent, sensible, and believable information on willingness to pay for improved water supply services" (Ibid, p. 133).

Finally, attention turns to the application of contingent valuation methods to urban water research. In urban studies, the pioneer research was that of Whittington and associates exploring the willingness to pay of households in Onitsha and comparing their bids to actual payments for water vending (Whittington, Lauria and Mu, 1989, 1991). Here, it was shown that the willingness of households to pay for improved water services was "surprisingly high" (Ibid, 1991, p. 194). The credibility of the methodology was once more tested and found to be acceptable. The research team for Onitsha was of the opinion that "the data collected from the contingent valuation survey seem generally consistent with the data from the water vending surveys and we believe the evidence is sufficiently accurate to be useful for decision-making" (Ibid, 1991, p. 193).

The most recent and richest application to urban water research of contingent valuation studies is contained in McPhail's (1993) work. This investigation focussed on households' willingness to pay for water in five small Moroccan cities using the approach of bidding games. It is important to note that these were "carefully designed using a pretested two-stage bidding process with high and low starting bids and an open-ended final bid query" (McPhail, 1993, p. 966) In addition, careful steps were taken to construct the sample of households to avoid potential biases. Illustratively, "neighbourhoods were selected on the basis of (a) no

advance warning of the survey (to avoid the chance for strategic answers by the respondents); (b) their "typical" nature that was representative of areas without individual house connections in these cities; and (c) surveying during the morning and afternoon as well as early evening hours to be sure that the unemployed and those who worked at home were not overrepresented" (Ibid, 1993, p. 964). Finally, it should be recorded that several tests were performed to determine the reliability of the willingness to pay bids.

The findings from the five-city Morocco investigation disclosed that "many low income households are willing and able to pay more than 5% of total household expenditures for individual water service" (Ibid, 1993, p.969). More expansively, the central research conclusion was that "households, even though they had free and reliable standpost water service, were willing to spend well in excess of 5% of total household expenditures to finance an individual metered water connection and the subsequent monthly commodity charges" (Ibid, p. 969). Indeed, in specific terms, "for many respondents the amount bid for this (water) service was slightly more than what they were already paying for electricity and was considered more important than any other household expenditures except food and clothing" (Ibid, p. 969).

Finally, as regards the validity and methodology of contingent valuation studies, the Moroccan example offered the following important set of conclusions. It was argued that the pursuit of "contingent valuation studies that incorporate reliability tests are not easy to execute and are both labour intensive and more expensive than simple water use surveys" (Ibid, p. 969). Nevertheless, the research "shows that rapid survey techniques can uncover important and surprising household water use characteristics that could greatly benefit water supply planners, donors and lenders" (Ibid, p. 969). Moreover, considering "the cost of the information learned from these surveys versus the investment required for most piped water systems, the use of household questionnaires should become an inherent part of project design and planning undertaken in developing countries" (Ibid, p. 969).

It is evident from the above review that willingness to pay research has been undertaken in a variety of urban and rural areas across the developing world. The empirical findings of these studies clearly do exhibit elements of variation. Nonetheless, based on surveys undertaken of several projects around the world, Briscoe and de Ferranti (1988) isolate a number of broad factors which determine consumers' willingness to pay for improved water supply. Although intended to apply to rural water provision, their findings apply equally well to the situation of urban communities:

- Perceived benefits (convenience, amenity and economic benefits are important to users),
- Income (households with higher incomes are willing to pay more),
- Water charges (the higher the charge the lower the usage or consumption),
- Other prices (prices are often compared to prices of other services),

- Value of women's time (as women in developing countries are generally the members of houscholds responsible for water collection. If their time is valued then there is a greater willingness to pay for improvements to these services),

- Level of service (users are often unwilling to pay for a low level of service, but more willing to pay for a better service),

- Characteristics of the existing source (if existing sources are deemed acceptable then willingness to pay for improvements is low)

- Other productive activities (where water can be used to increase home production of crops and for keeping livestock, willingness to pay is likely to be higher),

- Credibility of external agency (willingness to pay is relatively high when agencies have demonstrated that they can deliver what people want, but low where communities have had bad experiences in the past).

Finally, in terms of empirical works, note should be made of South African research on "unwillingness to pay". This theme was illustrated with the rent and service boycotts of the late 1980s and early 1990s. Core factors behind township residents unwillingness to pay included a perception that services were inadequate, through fears of intimidation from other members of the community and due to a protest against the apartheid political system, in particular of the State of Emergency and the presence of SADF troops in the townships. Accordingly, in the South African context, the historical distortions produced by apartheid have introduced a further layer of complexity into the willingness to pay' issue (see Van Ryneveld, 1992; Schur, 1992; Freiman, 1994; Goldblatt, 1994).

2.2.5 Summary and Conclusions

The task in this review was to draw together and synthesize the key findings and arguments of those studies that focussed on 'willingness to pay' in the water sector. The first section of material stressed the surprisingly meagre volume of work that has been undertaken internationally on willingness to pay given particularly its crucial significance for water project planning. It was emphasized that for developing countries the question of willingness to pay is an important policy relevant research issue that demands greater attention than it hitherto has received. Pioneer research on willingness to pay for rural and urban water projects was, however, launched by the World Bank and other development agencies in the 1980s. In the second section of this report, the focus was placed upon the usefulness of conducting rapid reconnaissance surveys of what consumers actually already pay for water services. In this respect, surveys of water vending practices were shown to yield particularly rich sources of information that can inform water resource planning. Undoubtedly, such research provides a better planning information base than the traditional 'conventional wisdom' of a 5 percent rule of thumb analysis of household willingness to pay.

Finally, in section three, the axis of discussion centred on the renaissance of household questionnaire studies on the water sector and especially of the growing acceptance of contingent valuation surveys. The results of several empirical studies do point to the conclusion that whether dealing with a rural village or an urban settlement "conducting a

relatively simple household survey can yield reliable information on the population's willingness to pay for improved water services" (Whittington, Briscoe, Mu and Barron, 1990, p. 308). Indeed, they point to the view that "contingent valuation surveys may prove to be a viable method of collecting information on individuals' willingness to pay for a wide range of public infrastructure projects and public services in developing countries" (Ibid, p. 308).

3. INFORMATION NEEDS AND METHODOLOGIES

3.1. Introduction

There is an urgent need for communities to develop a system for gathering information which will enable them to assess their effective demand with as little support as possible from "outside". This will enable them to decide how much they are willing to pay for which level of service. However, to be able to do this, the community first has to establish its information needs and be aware of how to get hold of the required information. This chapter guides on how this could be done.

3.2. Objectives

The objective of this module is :

- To identify the information needs on the willingness and capability of community members to pay for a selected environmental infrastructure component

- To select the most appropriate combination of methodologies to collect the required information.

3.3. Strategy and Outputs

3.3.1. Strategy

Based on the findings of CEMIS module III, the community will review the selection of related environmental infrastructure technologies. The review will be based on the economic aspects of the technology, installation, operation and maintenance costs etc. Based on this, the workshop will identify which information is needed related to the willingness and capability to pay for a selected environmental infrastructure technology. This is followed by a discussion and selection of how the required information will be gathered.

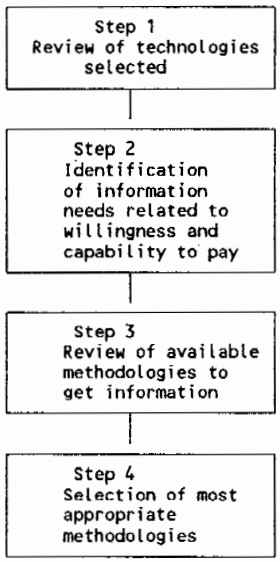
3.3.2. Expected Outputs

The expected outputs will be:

- selected appropriate technologies on the provision of selected environmental infrastructure
- information needs related to willingness and capability to pay in order to plan an infrastructure improvement programme
- appropriate methodologies for collecting data

3.4. Steps of Activities

The following steps could be followed to achieve the above objective:



3.4.1. Step 1: Review of Technologies

As discussed in CEMIS module III on the "technological options" various available technological options should be reviewed and taken into considerations. The adopted technology should effectively alleviate environmental infrastructure problems identified by the community, and put into consideration installation, operation and maintenance costs.

An appropriate technology means technology that is practical and economically viable, satisfies the needs of the users and is socially acceptable.
Thus appropriate technology is characterized by :

- Sociocultural appropriateness
- Affordability
- Ease of maintenance with the skills available in the agency or community
- Maximum use of locally available materials or spare parts
- Easily understood attributes
- Technical efficiency

The choice of an appropriate technology is thus determined by an array of technical and non-technical factors which should be analysed, discussed and finally agreed by the local authority and the community

In step 1, the community will be re-familiarized with the different selected technical options of an environmental infrastructure component. Technical options will range from new installations to the improvement or revitalization of existing inadequate services. For instance, increasing the efficiency of water vendors and improving the water quality by providing better water carriage and storage facilities.

The focus of this review will mainly be on the economic implications, installation, operation and maintenance costs. Table 1 provides an example of typical costs of different urban water supply technologies.

Table 1 Typical costs of different urban water supply technologies (in US$ per capita)

Level of service	Typical construction cost	Equivalent annual amount (1)	Typical water consumption (2)	Annual operating cost (3)	Total annual cost
Public standpost	60	8.88	20	2.55	11.55
Yard tap	80	11.84	60	7.66	19.50
Private connection	120	17.76	150	19.16	36.92
1. Converted on the basis of amortization over 10 years at 10 per cent interest 2. In litres per person per day 3. Calculated on the basis of $0.35 per cubic metre					

Source: WHO in CAIRNCROSS 1990, p.122

3.4.2. Step 2: Identification of Information Needs

3.4.2.1. Scope of information needed

The basis for undertaking the assessment of effective demand is the information needed by the community to make decisions. The required information is heavily dependent on which environmental infrastructure component the community wishes to focus on and will vary accordingly.

The following box 2 provides an example of information needed when assessing effective demand of communities for water supply (beside the household characteristics).

Box 2 Key questions raised when gathering information on assessing effective demand for water

1. How much water does a household consume per day and for what?
2. What is the household coverage with water supply technology and how satisfied is the household with the services?
3. How much does a household pay for water per day?
4. How much water does a household want to consume per day? or How much water does a household need?
5. How much is a household capable to pay for water?
6. How much is a household willing to pay for water and which water supply technology does a household prefer?

1. How much water does a household consume per day and for what?

The first issue which has to be addressed under this question is a definition of what a household is. This may vary from country to country. In some cases, it is people living within the same economic unity. In this case, household would mean all the people, such as family, lodgers, etc, living together in a house.

A household consumes water for different purposes, such as:

- personal hygiene (washing and bathing)
- cooking and drinking
- cleaning houses and washing clothes
- working or domestic industries
- growing food

2. What is the household coverage with water supply technology and how satisfied is the household with the services?

The question will principally look into the main sources of water supply. These are :

- river, lake, swamp
- rain, rainwater harvesting
- wells, handpumps
- water vendor
- water tap

  - in-house
  - yard tap
  - public standpost
- bottled water

What is also important to highlight is who the owner of the water source is. This could range from the individual household or communities owning stand posts, wells, hand-pumps or lakes. Water could also be provided through small scale entrepreneurs like water vendors, private/or public water utilities. The last issue under this question explores the reliability of the water source. An example would be how many hours per day a water tap provides water. This would be a qualitative assessment of services as perceived by the household or community. In addition, the issue of the quality of water (smell, colour, taste etc.) from each source is of importance, since water from different sources are used for different purposes and this also relates to the health implications for each.

3. How much does a household pay for water per day?

When speaking of payment for water, one has to differentiate the cost of installation of water services and their later operation and maintenance costs. In many instances, communities do not contribute towards the installation costs, but rather contribute towards the operation and maintenance costs. Another example would be the case of water vendors, who would translate the installation costs and profit into the daily costs of water charged to households. Payments vary depending on the water sources, and therefore the amount of water consumed from each.

4. How much water does a household want to consume per day? or How much water does a household need?

It is necessary to determine with each household the basic needs for water for drinking, food preparation, cooking, washing, bathing and other essential uses.
This information will be useful later in the determination of the price to be paid for "lifeline use" i.e. for the satisfaction of basic needs.

Asking the amount of water that a household wants to consume or need per day is very subjective. The interviewer should guide the respondent to calculate the amount of water needed based on the number of household members, the household activities and other sources of water they own (pump, well)

5. How much is a household capable to pay for water?

The capability of the household to pay for water could be estimated based on the actual expenditure on water, for instance costs for water bought from the vendors.

6. How much is a household willing to pay for water and which water supply technology does a household prefer?

Estimation of willingness to pay is based on what is paid at the moment, or on the consumer's perception of the value of the effort currently required to collect the water.

To get the data on willingness to pay of each household, a series of prices should be offered to each household. The variation of prices should be based on the price from the public water company.

For the technologies preference, several kinds of possible technologies should be offered, such as :

- individual connection
- shared house/yard connection
- communal washing and bathing facilities
- public standpipes
- water hydrant (distributed by water vendors)

3.4.2.2. Sources of information

Sources of information could be primary or secondary data.
The sources could be :

* Household and community register (if available)
  It will enable the community members to identify individuals or underserved groups. The household and community register will provide information on :

  number of individuals/households in the area - age, gender, health status of household members
  - social economic status
  - social activities.

  If possible, the information should be as recent as possible.

* Local authorities and government offices

  The community members will be able to obtain information on costs and tariffs related to infrastructure. Information on policy, services provided, short term plan, can also be provided to community members.

* NGOs and other aid agencies

  These will provide community members with information on community organization and training; logistical information, financial management skills; personnel with expertise, information on technological options; skills on data collection, analysis, presentation and storage.

* Community surveys

  These will enable community members to acquire information on the community resource base, willingness to contribute (especially for water supply) and commitments towards an improved living environment. The estimate of expected growth in demand for water is based on a detailed knowledge of the living

environment and, in particular, on expected population growth and consumption patterns. This can be done through community self-surveys.

* Interviews and observation

  Interviews will enable community members and other participants to establish perceptions and attitudes, while observations will enable them to assess the real environmental situation in terms of sanitary facilities, road conditions, actual provision of water supply, sources of water etc

3.4.3. Step 3: Review of available methodologies

There are various sources of information and methodologies to tap these sources. These methodologies are described in classical text books on how to conduct social research. Table 2 provides an overview of preferred methodologies for collecting information on the willingness and capability to pay for preferred water services.

Table 2 Preferred methodologies for collecting information

Key Questions	Types of Data Required	Preferred Methods	Sources of Data
I. How much water is consumed per day and for what?	Quantitative	1. Community-self-survey 2. Community observation 3. Key person interview	household neighbourhood group household or water utility/water vendor local authority/water utility/water vendor
II. What is coverage with water supply technology (a) and satisfaction with services (b)?	(a) Quantitative (b) Qualitative	1. Community-self-survey 2. Key person interview 1. Community-self-survey 2. Community group discussion 3. Community group games	household research institute/local authority household household neighbourhood group neighbourhood group
III. How much does a household pay for water?	Quantitative	1. Community-self-survey 2. Community group games 3. Key person interviews	household neighbourhood group local authority/water utility/water vendor
IV. How much water does a household need?	Quantitative	1. Community self-survey 2. Community group discussion	household neighbourhood group
V. How much is a household capable to pay for water?	Quantitative Qualitative	1. Community self-survey 1. Community observation 2. Community group games	household neighbourhood group neighbourhood group
VI. How much is a household willing to pay for water and for which source?	Quantitative	1. Community self-survey 2. Community group games	household neighbourhood group

3.4.3.1 Community-self-survey/self-reporting

So far there is not much experience with the tool of community self-survey. The few good examples that exist and work emanate from the area of community health. The country with

the longest experience in conducting community self-surveys is Indonesia, where this has been practised for more than ten years. The approach is known as "mawas diri" in Indonesia and has been developed and applied by "Yayasan Indonesia Sejehtera" (YIS) an NGO which seeks to address environmental health issues.

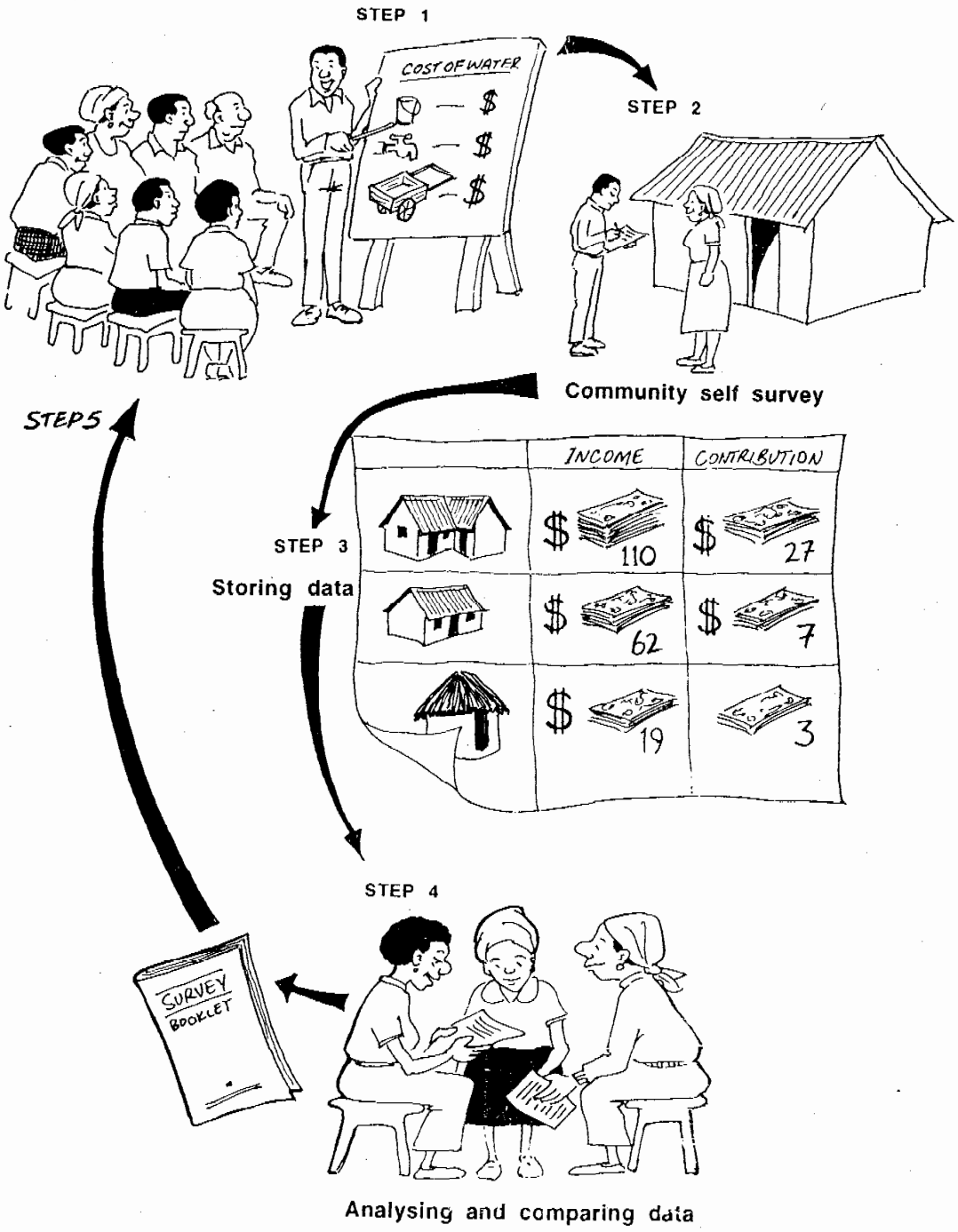
The following paragraphs are based mainly on Johnston (1993). The unique feature of the "mawas diri" survey form is that it is designed by each individual community in cooperation with a health or community worker. It is the community that decides which aspects of life, components and indicators are most appropriate for them. Lively and lengthy discussions usually take place when the form is being designed. Strong feelings of mutual responsibility and commitment develop. The more formal and informal leaders and community activists, such as volunteer health workers, are involved in the process, the more relevant the resulting form. However, despite the wide variety of circumstances in which mawas diri has been applied, the similarity in the indicators eventually chosen has been striking.

Using the community-designed form, volunteers visit between 15 and 20 families in their neighbourhood. Through discussions and observations with the households, they evaluate each item on the form marking it either as 'good', 'not good' and 'not relevant'. The problems in the neighbourhood become evident when the total number of 'good' (g) and ;not good' (ng) entries for the families visited are added up. The next step is for the community to discuss the three most common problems and determine priorities for action. When the scores of several neighbourhoods are totalled, a picture is obtained of the main problems in a certain village. Adding up scores from all sections gives a picture of the village situation overall. The three top priority problems are determined at the neighbourhood, area and village levels using data from various households.

Another good example has been developed by Aga Khan Health Services (AKHS). The following paragraphs are based on a field visit by UNCHS (Habitat) to Kisumu (Kenya) in 1992 (Dzikus 1992). AKHS have been conducting a community based primary health care project in a peri-urban area (Kajulu) and a rural area Nyakach of Kisumu District (Kenya). The project area has an estimated population of 64,000 people. One component of the project has been the establishment of a management information system (MIS). This MIS operates at two levels, the central (project) level and the community level. The central (project) level MIS is used to monitor and manage the projects as an implementation and donor agency. At community level the MIS is to fulfil community-based monitoring and self-assessment. Data is collected by 614 community workers, who do this on a voluntary basis and who are from the 72 communities. Each community worker is on average responsible for 36 households. The data collection was done after completion of domestic work commitments.

During the early stages of the project, the community workers used forms to collect environmental health data, visiting at least ten households per month. The data received during this period was very limited, as each form contained 36 environmental health indicators. The indicators were reduced to 23 and 15 successfully, which in turn reduced the amount of collected data and the time required to collect the data nearly halved. Still this procedure was very unsatisfactory. Recently, a register for every household was introduced, providing every house with a number. Each household member is now registered and the basic environmental health situation assessed.

Figure 4: Five steps of a community self-survey in Kenya



This system has proved to be very effective, as the community workers maintain the records and analyse the data themselves. The community workers now report to and actively participate in an environmental health committee, which is selected by the community. The committee, based on the provided information, identifies major environmental problems, prioritizes them, and proposes solutions. Figure 4 provides an example of five steps of a community self-survey in Kenya.

Community self-reporting

Indonesia has got a well-documented tradition of community self-reporting through health cadres, which was promoted by the Ministry of Health and UNICEF. Community self-reporting is based on providing each household with a house card known as "KARTU RUMAH".

This house card contains information on the housing and environmental conditions of each household, obtained from results of the baseline survey which is conducted by health cadres.

This card reflects the environmental conditions the households live in and, through it, the households are motivated to improve their housing and environmental conditions.

The housecard, enables the health cadres to identify and monitor housing and environmental conditions of the households. This card is also used to evaluate the impact of the cadres' activities towards the households.

The households who will be visited are given the card after the baseline survey is conducted. The importance of the housecard and how it should be kept is explained to each household. To prevent its loss, it is recommended to post it on the wall. Cadres can keep this card for households who do not want to keep it.

The card is first filed directly after the baseline survey is conducted, and the following is done during the routine visits by the health cadre. The routine visits are conducted every two to three months, depending on the time available.

To show the conditions of each household, three color pencils (black, blue and red) are used to fill in the box.
Each color has a specific meaning.

* a box shaded black means none,
* a box shaded blue means yes or available (can meet the requirements)
* a box shaded red means available but out of order or does not meet the set requirements,
* a half box shaded blue means not personally owned but meet the set requirements,
* a half box shaded red means not personally owned and does not meet the requirements.

Figure 5 below provides an example of a house card in Indonesia (translated from Indonesian).

Figure 5: House Card in Indonesia

Head of Households Name :		**Village :**	
No. of Persons :		**Subdistrict :**	
Neighbourhood block no. :		**District :**	
Hamlet no. :		**Province :**	

	Supervision by Community Volunteer	Supervision by Health Centre Sanitary	Supervision of District Sanitary
I. ENVIRONMENTAL HEALTH FACILITIES	1 2 3 4 5 6	1 2 3 4 5 6	1 2 3 4 5 6
1. Sewage for excretat			
2. Clean Water Supply			
3. Garbage disposal			
4. Waste Water Sewage			
II. HOUSING CONDITION			
5. Bedroom window			
6. Chimney			
7. Not humid			
8. Not crowded compund			
III. VECTOR OF DISEASES			
9. Larva free			
10. Rat free			
IV. YARD			
11. Clean			
12. Utilised			
V. STALL (IF PRESENT)			
13. Separate from the house			
OBSERVANT NAME			
DATE OF OBSERVATION			

None — Yes or available and meet the requirements — Available but out of order or does not meet the requirement — Not personally owned but meet the requirements — Not personally owned and does not meet the requirements

3.4.3.2. Community observation

Observation means watching or noticing by using all our five senses: seeing, touching, tasting, hearing and smelling. One person cannot observe everything, especially not at the same time.

As it is impossible to observe everything at the same time, and as we put our own interpretations on what we observe, observation can only be used as a reliable source of information when our observations are (a) focused and (b) systematic. By 'focused', we mean that the observations are strictly directed at what we want to know, learn and understand. By 'systematic', we mean that the observations follow a fixed plan, so that things are observed in a thorough, efficient and unbiased way. Observation as a data collection method is a skill that has to be learned.

Observation, just like interviewing, allows us to collect qualitative and/or quantitative data. Qualitative data are primarily used to discover, explore, describe and understand hygiene behaviour, and to gain insights into patterns of behaviour and into people's motivation, attitudes, interests and constraints.

3.4.3.3. Community group games

There are three methods to conduct community group games:

- contingency valuation method;
- rating;
- ranking.

a. Contingency Valuation Method (CVM) and Bidding Games

Introduction

Contingent Valuation is a survey technique for gathering information (e.g. on the target groups, a person or household) on preferences for goods or services. It originated as a tool of environmental economics - a means of assigning monetary values to environmental amenities.

According to Mitchell and Carson (Mitchell, 1989, p. 68), a contingent valuation interview typically consists of three parts :

1. A detailed description of the goods being valued and the hypothetical circumstances under which it is made available to the respondent. This could be, for example a public stand pipe that would be installed near someone's house. Whatever the good being valued, the description is intended to provide the respondent with as clear an idea as possible of the good being valued.

2. Questions which elicit the respondents willingness to pay for the goods being valued. These questions are asked on the presumption that without the respondents payment, the good would not be provided. They could be reduced to a single direct question

as to the maximum the respondent would be willing to pay for the good in question. They could involve a bidding game, wherein a series of offers are made to the respondent in an attempt to help guide them to their maximum willingness to pay. Or, they could be a simple yes or no question, referring to a single value.

3. Questions about the respondents characteristics (for example, age, income), their preferences relevant to the goods being valued, and their use of the goods. While not an inherent part of the CVM, most surveys collect background information either simply in order to understand what influences the values people place on the good, or with a more specific purpose in mind.

Methodology

The methodology of contingent valuation surveys are the same as those of any other sample survey. The sampling theory and the qualities of a good survey instruments are similar to those of any other good sample.

The Application of CVM

The seven most important applications of CVM (several of these are not very relevant in low-income countries) are:

1. Should rely upon personal interviews rather than telephone surveys where possible, and on the telephone surveys in preference to mail surveys.

2. Should elicit willingness to pay to prevent a future incident rather than minimum compensation required for an incident that has already occurred. (Note that the latter would be the theoretically correct measure of damages for an accident that has already taken place).

3. Should utilize the referendum format; that is, the respondents should be asked how they would vote if faced with a programme that would produce some kind of environmental benefit in exchange for higher taxes or product prices.

4. Must begin with a scenario that accurately and understandably describes the expected effects of the programme under consideration.

5. Must contain reminders to respondents that a willingness to pay for the programme to policy in question would reduce the amount they would have available to spend on other things.

6. Must include reminders to respondents of the substitutes for the commodity in question.

7. Should include one or more follow-up questions to ensure that respondents understood the choice they were being asked to make and to discover the reasons for their answers. (Portney, 1994, p. 66)

Box 3: Contingency valuation method: Willingness to pay for water in Jakarta (Indonesia)

The CVM survey in Jakarta (Indonesia) included a description of the hypothetical water services offered, questions on the respondents willingness to pay, and questions on relevant household characteristics. (There were two versions of the survey. In the first version the least attractive option was offered first, and in the second version the most attractive option was offered first).

The survey was designed to evaluate what were treated as four different options :

a. A standard water connection with a substantial connection fee, to be paid in a lump sum.

b. An improved water connection, providing potable water with full reliability, with the same lump sum connection fee as A.

c. A standard water connection, but with the possibility of paying the connection fee in monthly instalments over a three year period.

d. An improved water connection with the connection fee to be paid in monthly instalments.

20 households at a time were requested to provide their bids. The final survey results suggest that a wider range of monthly fees should have been employed.
The respondents were asked a series of questions about the characteristics of the household, such as :

1. The economic status of the household.
2. Land tenure.
3. Existing water sources, practices and perceptions.
4. Household size and composition, and education of principal householders.

Before the implementation of CVM, a pre-test was done. The pre-test was used for developing the survey instrument. It was done applying the survey to 20 households in each of the neighbourhoods. The average interview time was found to be 20 minutes. Some women were unwilling to answer the questions, and requested that their husband be asked to respond.

It was found that many households claimed they could pay monthly bills as this varied depending on the actual consumption levels.

Contingent valuation is not a particularly easy method to apply or to analyze. Nevertheless, in the right circumstances it can provide results of clear policy relevance. In the case study presented, it was found that, as one would expect, vendor using households valued connections more than households using wells for drinking water. The results suggest that, if the sampled households are fairly typical, the difficulties and cost of connecting to the system are a large part of the reason why so many households choose not to connect. The alternative solution offered by the findings of the contingent valuation study in Jakarta would actually cost the water utility the same, as long as defaulting on water payments could be prevented or kept to a smaller percentage.

b. Voting

Voting is a basic principle of democracy and enables communities to acquaint themselves with procedures for collecting and analysing data. The group would be provided with different pictures, for example of different domestic water supply sources. Participants would express their choices by placing their selected picture into a pot or pocket. When everybody has voted, the pockets/pots are emptied, the votes counted, and the findings discussed. (Boot et al 1993)

c. Ranking

c.1. Preference ranking

Sample ranking activities can elicit preference from both individuals and groups. It covers both individual ranking and combining of individual preference rankings to provide a group ranking. A diagram should be employed to portray environmental problem areas, with additional diagrams made during the discussion .

c.2. Wealth ranking

Communities are very well aware of the distribution of wealth in their neighbourhood. It is possible to identify groups or clusters of households according to relative wealth or well-being. In this case the names of all households of predefined areas, e.g. 50 households are recorded in slips of paper. The participants are then requested to group them into piles according to wealth. The wealthiest are put at one end, the poorest at the other end, and as many piles as desired are made between them. This activity can be done individually, during the community self-survey, or in a group. (Boot et al 1993).

3.4.3.4. Community Focus Group Discussion

The following text is mainly based on Skinner (1991). The focus group method involves a number of people meeting in a group situation in which the participants talk to one another under the guidance of a facilitator, for the purpose of generating relevant ideas and information around a prearranged topic. These focus group discussions are aimed at providing insights into the attitudes, perceptions and opinions of participants.

Focus groups can be used at relatively low cost and can be set up in a relatively short space of time. They can produce results that may directly represent how people are feeling as they often re-create the social situation. People often get stimulated by the discussion to talk and to reveal facts and opinions that they may otherwise not have wished to reveal. It may also give group members the chance to clarify certain ideas, attitudes and beliefs that they are feeling but were unable to articulate. Focus groups can be used flexibly, for example to evaluate projects and to obtain perceptions of what the major needs in a community are. Focus groups can help to build the community involvement in the intervention being evaluated or planned. The major disadvantage of this method is possible peer pressure in the group, which may inhibit some members from expressing some of their concerns.

Ideally a group should number between six and ten members, plus a group leader and observer/recorder. Membership of the group should be a balance of homogeneity and contrast.

The selection of groups should aim at representing all relevant subgroups of the population thus making the results more generalisable to the community. On the other hand, pre-existing groups which may consist of members of community organisations or youth groups or even women groups who meet every day around a central water tap, may also be used, as they represent a specific target group.

The site selected for the discussion should be private and comfortable, free of disturbance, and at a convenient meeting point for the members of the group. The optimal time span for a group discussion is between 60 and 90 minutes but the demands of the study need to be taken into account. It may also be possible to organise more than one meeting for the group.

The task of facilitating the group falls upon the group leader. The facilitator should work from a pre-established list of points or schedule which can be used as a guide to ensure that all important points are covered. The schedule should not be allowed to limit discussions.

Prior to starting the group, it is important for the facilitator to open the discussion by welcoming the group and getting everybody introduced, providing an overview of the topic, outlining the ground rules for the discussion, getting permission for the use of the tape recorder and explaining the role of the observer/recorder.

There are a number of issues that the facilitator needs to be aware of while running the group. These include:

1. The group must remain focused and discussions on side issues limited.

2. Difficult personalities such as dominant people, excessively shy persons, those who ramble, and argumentative members need to be monitored and controlled so that they do not disrupt the group. A balance of participation between the different members is important.

3. Potential group members need to be motivated by the facilitator, or some other intermediary person, in advance in order to get around the problem of cancellations and no-shows.

4. The group leader needs to guard against his/her powerful role biasing the group.

5. The group leader will at times have to use probes, such as direct questions, to elicit additional information of interest. Probes should not be overused as this will inhibit discussion.

At the end of the discussion, group members should be thanked for their participation and be briefed on what will be happening with the information that was gathered in the group.

Recording the information is the role of the recorder or observer. For every group, there should be an audio tape record. In addition, the recorder should keep detailed notes on the body language, social processes in the group as well as brief notes on what was said.

Focus group discussions may take one to two hours to conduct, but transcription and analysis is very time consuming. It is thus important to simplify this method for use by communities and to limit the number of group discussions (Boot et al 1993).

3.4.3.5. Key person interview.

A key informant is a person who is specially knowledgeable, at least in some subjects or topics of interest, and with whom the interviewer develops an ongoing relationship of information exchange and discussion. The difference between a general informant and a key informant is that general informants primarily give information about themselves, whereas key informants provide information about others or specific situations, events and conditions in the study area. General characteristics of good key informants are that their views and knowledge should represent those of a larger group, and that they should be ready to communicate and exchange information with the interviewer.

3.4.4. Step 4: Selection of most appropriate methodologies

Table 3 provides an example of the selected most appropriate methodologies for data collection conducting information by a community. Depending on the local conditions, the community would decide which methodology to utilize to gather the required information. Depending on the selected methodologies, only one, two or all of the three modules (III, IV, and V) would be of importance.

Table.3 Example of the selected most appropriate methodology to collect information.

No.	Sources of information	Types of information	Methods of data collection	Tools
1	Community as the water users/ households	- household characteristics (socio-economic); - the sources of water used by each household; - the total consumption of water/day/household; - the utilization of water by each household (cooking, washing, bathing, etc.); - expenditure for water/day; - the capability of household to pay for water; - the willingness of households to pay for water.	- community self-survey - a focus group discussion with the community could be conducted before CSS in order: * to get general idea on that specific topic; * to have input for developing questionnaire	- structured questionnaires - guidelines
2	Key informants			
	2.1 Local authority water utility	- the policy of the departments; - the services provided, tariffs and costs	- indepth interview	- questionnaire
	2.3 NGOs/ universities, research centres	- the policy of these institutions; - types of activities: whether they work in the areas of environmental infrastructure; - types of support provided (training, technical assistance, funding, etc.); - action research is preferred	- indepth interview	- guidelines
	2.4 Local key persons	- problems encountered in their area; - resources available; - how to mobilize the community; - support.	- focus group discussion	- guidelines for interviews

4. IMPLEMENTATION PLAN FOR COLLECTING INFORMATION

4.1. Introduction

Many community-based initiatives experience difficulties in attaining their anticipated goals as they have not developed a detailed implementation plan. Based on the identified information needs and requisite methodologies for gathering the information, the community should develop a detailed implementation plan. The implementation plan should be based on the establishment of a management structure responsible for the overall community activity which would supervise the implementation team. The implementation plan would allow the community to ensure that the envisaged goals are attained and requisite resources are mobilized, as well as to monitor progress made.

4.2. Objectives

- To develop and adopt a detailed implementation plan for the collection of the required information through key person interviews, community self-surveys and group activities

- To mobilize the required resources for this undertaking

4.3. Strategy and Expected Output

4.3.1. Strategy

1. Community workshop

   The implementation plan could be developed through a community workshop that will be conducted by the community. The workshops could be jointly organized by the community with local authorities, or other sectors that are related to the provision of water (public water company). The external agencies (NGOs, research centres, university) could act as facilitators based on their expertise.

2. Participatory planning

   The participation of all the concerned actors in the development of the implementation plan is needed to safeguard the success of later environmental infrastructure interventions.

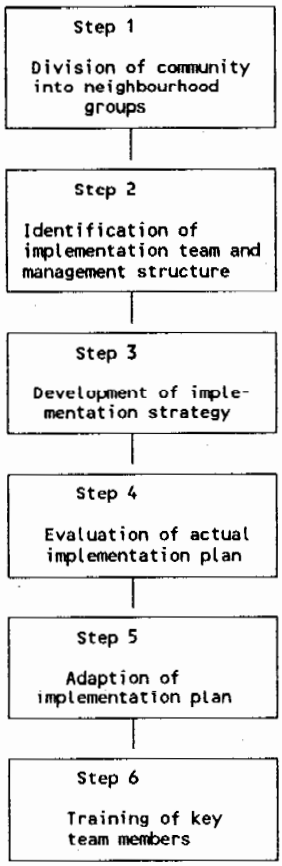
   The main actors would be the local authority, community volunteers, community leaders (neighbourhood level), and other key persons etc.

4.3.2. Expected Output

A detailed implementation plan for assessing effective demand of a community for a selected environmental infrastructure component, for instance the provision of clean water.

4.4. Steps of Activities

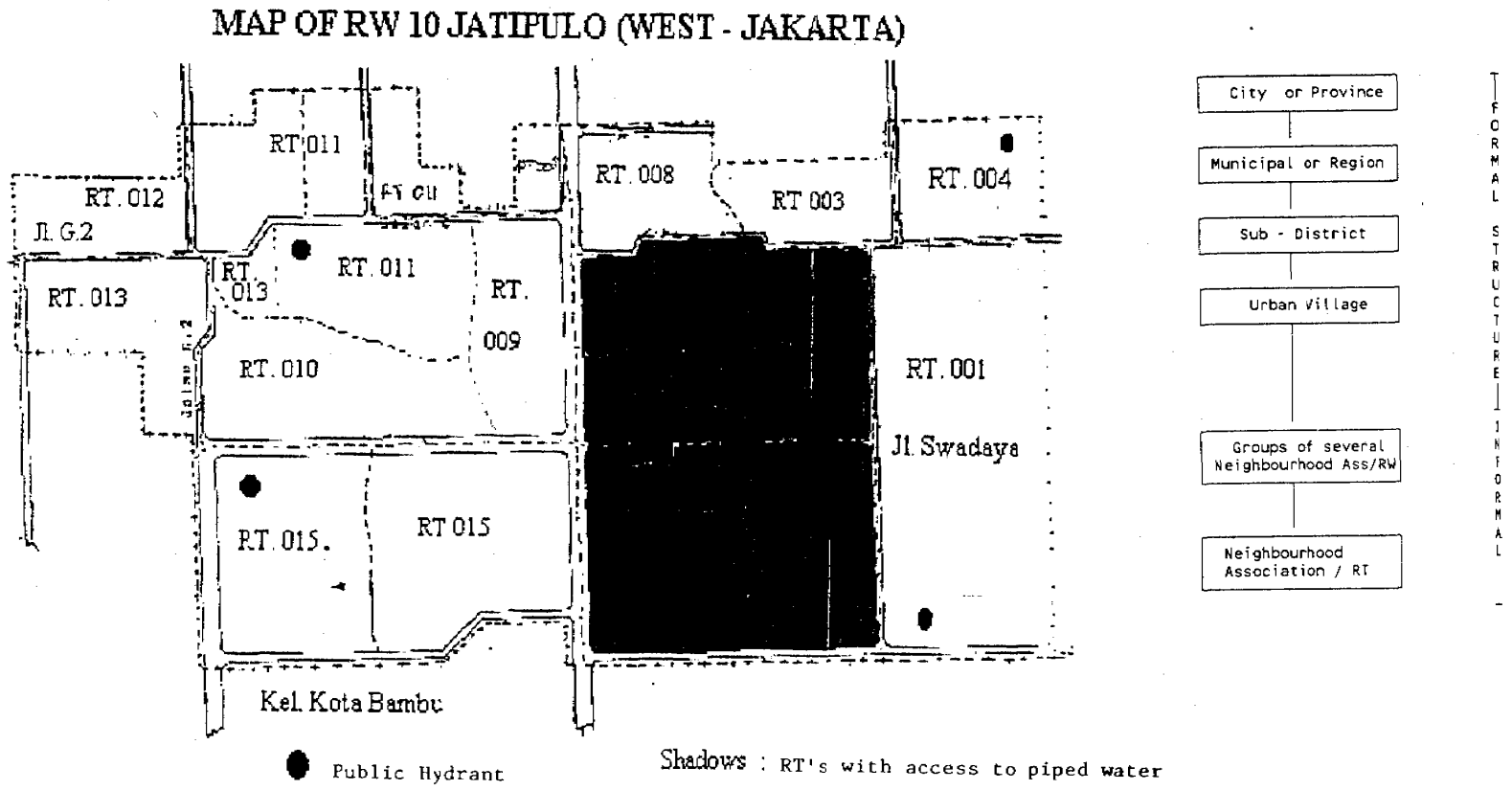
The following steps could be followed:



4.4.1. Step 1 : Division of community into neighbourhood groups

In this step, the community who will be respondents or water user group could be divided into groups based on the administrative divisions (area division). In Indonesia, the lowest level of community organization is a neighbourhood association (RT) which in the following text is mentioned as 'neighbourhood'. It is an informal organization with homogenous population characteristics, that is, they have similar characteristics (socio-economic status, place of origin). Due to this homogeneity, it is an advantage to have groupings at the neighbourhood level. For instance, a certain group of water users within a certain neighbourhood who are interested in constructing a shared water facility. The next aggregate level are neighbourhood groups (RW), which aggregate to an urban village or community

Figure 6: Example of formal and informal administrative level structure in urban Indonesia



The figure 6 also provides an example of a map dividing a community in Indonesia into neighbourhood associations and neighbourhood groups. Each neighbourhood would have one or two selected representatives elected by the community. These would elect one or two representatives for the whole neighbourhood group, who would act as representatives at workshops or meetings.

4.4.2. Step 2: Identification of implementation team and management structure

A team that will run the activities will be nominated, and a management structure will be built which consists of :

- Facilitators	:	NGOs, university, other aid agencies, community health workers or local leaders.
- Chairman	:	local leader
- Vice-chairman	:	neighbourhood representative: local key persons
- Secretary	:	neighbourhood representative
- Members	:	community representatives local key persons.
- Interviewers	:	community volunteers (which will be trained).

The total number of persons required as community volunteers depends on the total number of respondents and the area that will be covered. Annex 1 provides a detailed overview of the management structure.

4.4.3. Step 3 : Development of an implementation strategy

After the formation of a management structure, the team can then develop the implementation strategy.

Some strategies for the implementation plan could be:

* Description and map of the geographical area (see also figure 6);

- the target population;
  i.e. households who have no access to piped water;

- the area that will be covered
  i.e. the area could be the whole community or only several neighbourhood associations that are interested

  map of the project area; simple mapping can be employed to show the environmental infrastructure problems, for example the location of water hydrants, group of household who have access to piped water etc. (see figure 6)

* Tasks and personnel for data collection

Table 4 below details the task of each member in data collection (interview, community self-survey and group discussion)

Table 4: Tasks of team members

Activities	Persons responsible	
	Personnel	Facilitators
1. Interview key informants	Selected delegates : - chairman, vice-chairman, local key persons	- NGOs - university - community/CBO
2. Community Self-survey	- trained community volunteers	- NGOs - university - Health sector
3. Community Group Activities	- community members - key persons	- NGOs - university - community/CBO

* Data collection mechanism

The data will be collected through one or any combination of the three methods :

- Interview with key-persons
- Community self-survey
- Community group activities

* Training of team members

Before starting the activities, the key team member (step 6) should have been trained focusing on several important issues :

- the mission of the project
- the objectives of the project
- the strategy that will be used
- the activities to be conducted
- the tasks of the key team members
- the resources needed

Table 5 Sample implementation (operational) plan for community self-survey

Activity	Agency / Person to be involved		Target of Population	Place of activity	Duration of Activity	Type of Resources	Sources
	Lead	Support					
1. Community self-survey	Local leader or Head of CBO	Community volunteers	Households (N=200)	NH 07 NH 08 NH 10 NH 12 NH 15	4 weeks	1. Human -facilitator -interview 2. Finance -transport 3. Material -questionnaire -stationary	* NGOs * Research centres * Local community * Local contributor * NGOs * CBOs * Government

NH = neighbourhood

4.4.4. Step 4 : Evaluation of actual implementation plan

It is important to synchronise new programmes with on-going community activities while drawing up an implementation plan.

A SWOT (Strength, Weakness, Opportunity and Threat) analysis (for an example, see table 6), or Comprehensive Planning Method (HIPPOPOC and Dynamic Model) can be employed by the team to evaluate the failure of the previous programmes especially related to the provision of water supply. Annex 2 provides a detailed overview on the application of the comprehensive planning method.

Table 6: SWOT analysis of new piped water installation in Kelurahan Jati Pulo, Jakarta (Indonesia)

STRENGTH	- Motivation of the local leaders and the community to participate/contribute towards water installation; - Availability of local human resources.
WEAKNESS	- Low socio-economic status (urban poor community)
OPPORTUNITY	- Public water company is planning to provide new water services to the community.
THREAT	- Many public hydrant owners in that area - Limited access to the area, due to small roads

The evaluation is needed to make sure that the implementation of the new activities do not overlap with other ongoing or planned activities/as well as to ensure that the mistakes of past or ongoing activities are not repeated.

4.4.5. Step 5: Adoption of the implementation plan

The implementation plan should be adopted before the implementation. The adoption is required to achieve conformity with the community situation that will be surveyed.
To enable participants identify individuals or underserved groups household and villages should be registered, while at the same time determining the size of the target population in need. The process of adoption will also ensure that there are sufficient resources available for the implementation and formalize the collaboration with the local authority and water utility.

4.4.6. Step 6 : Training of key team members

The aim of this training is to improve the knowledge and skills of the key team members in project management, in mobilizing the communities involved and coordinating the implementation of community self-surveys, key-person interviews and group activities. The training objectives will include an overview on how to analyze, present and interpret data that has been collected. The trainers could be from NGOs, research centers, CBOs, village groups etc.

5. KEY PERSON INTERVIEW WITH LOCAL AUTHORITY, WATER COMPANY, PRIVATE WATER UTILITY

5.1. Introduction

A lot of the information communities require already exists at secondary sources. Water utilities for instance can provide information on the structure of tariffs and costs.

This module will highlight the information collected from the key informants through an interview. This module also discusses about how to develop the guidelines for an interview, how to conduct interviews, store and analyse the data. This kind of data will be used as an input for modules IV (Community Self-Survey) & V (Community Group Activities). Beside data collection, contact with the key informants will enhance the establishment of partnerships with the local authorities and the local water company/public water utility. A good working relationship (partnership) will enhance the success of the community activities, for instance the provision of clean water supplies to the area.

A solid partnership relationship is important for both communities and external agencies to enhance and safeguard a joint decision making, consultation, conflict resolutions, mobilization of resources, and an implementation of agreed actions.

5.2. Objectives

The objective of this module is :

- To gather all available information from secondary sources through key-person interviews with the relevant local authority, public or private water utilities, research institutions, non-governmental organizations etc.

- To establish a close working relationship with relevant key persons and/or institutions.

5.3. Strategy and Expected Output

5.3.1. Strategy

An indepth interview could be conducted with those relevant key informants. For instance, for the provision of clean water supply the key informants could be the local authority (head of the community) the public works department, public water company, city planners, local NGO, research centres/university etc. The university/research centres could give technical assistance and the NGO's could assist in the implementation of the project (expertise) or could contribute funds.

In a bid to get information from the local key persons (religious leaders, head of the neighbourhood association, teachers etc), a Focus Group Discussion (FGDs) would be a more appropriate method than indepth interviews. It will be faster to get the information and the data is likely to be richer in content, although it may not help to build a consensus among various groups. In FGDs, a small group of interested people are brought together to discuss

a particular topic (water supply). A facilitator can help maintain a focussed discussion by guiding the group on relevant issues, and assist the group in synthesizing the issues covered.

5.3.2. Expected Output

Data from relevant key informants about :

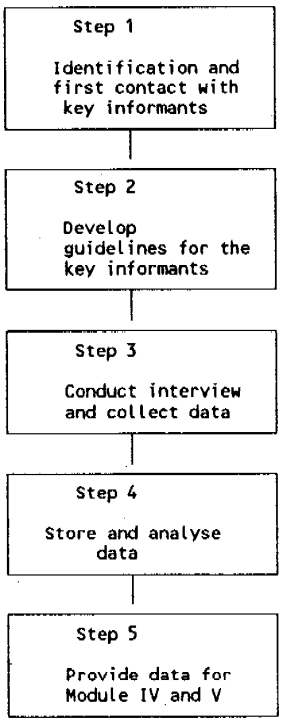
- the policy and services of public water company
- the policy and planning of relevant ministries, such as the Ministry of Housing for this specific area.
- policy and planning of the city planning department
- the activities of NGOs, research centres, universities
- perceptions of local key persons
- tariff structures (installation costs, operation and maintenance costs)

Table 7: Main sources and types of information

No.	Source of information	Type of information
1.	Local authority	- Government policy The local planning
2.	Public Water Company	- Policy and Regulation of the office Area to be served Construction cost Connection charge Operation and maintenance cost Regular user charge Possibility to connect
3.	City Public Works Office	- Construction Planning in area Possibility to integrate with construction of the piped water supply
4.	City Planning Office	- Planning of the city especially for the affected areas
5.	City Housing Office	- Planning of housing construction in the area
6.	Local NGOs/CBOs	- Possibility of building a working relationship, Technical assistance Funding
7.	Research Centres, Universities	- Technical assistance (appropriate technology methodology, training)
6.	Local Key Persons	- Information about the planned project Resources available participation/Support

5.4. Steps of Activities

The following activities could be followed:



5.4.1. Step 1: Identification and first contact with key informants

Step 4 of module 1 has identified the information needs and how the information will be collected. Responding to this, step 5 of module II has adopted an implementation plan for the collection of the information. According to this plan, key informants will be identified and contacted. To get relevant information, several key informants should be interviewed especially agencies related to the provision of water supply. These could be:

- The local authorities

  The head of the community (in the urban Indonesia, known as the Lurah) is an important person to contact at the beginning of the project because he/she is the lowest representative of the government administrative structure. He/she and his/her staff are responsible for the bottom-up planning approach in their area. Support from the local authorities is a necessity.
- The public water company

  An understanding of the policy of this company in the provision of clean water is very important. For instance, the company's five year plan for the whole city, may indicate

the areas that will be offered new services, costs and the possibilities of providing new services using a community participatory approach.

Other related departments are the public works office, the city housing and planning offices. The provision of piped water will influence the scope of related work of the other related departments. These agencies should be included.

- The local NGOs

Some specialized local and international NGOs, offer technical assistance to communities and possibly funding. Some NGOs have a proven track record in the area of environmental infrastructure.

- The research centers, universities

Many universities and research centers conduct research in the area of environmental infrastructure and have gathered considerable information on communities. They can be important resources in providing technical assistance, such as assessing appropriate methodologies and training the key team or community volunteers.

- Local key persons

The local key persons such as religious leaders, school teachers, women groups, clan/tribal welfare associations, youth organizations, head of the neighbourhood association (RW) etc are very important partners.

The local key persons are the local potential persons to support the success of the project.

A semi-structured questionnaire would be an appropriate tool for conducting interviews with key informants. In a bid to increase efficiency and gather more information, a focus group discussion could complement the key persons interviewed.

During the first contacts with the key informants, a delegation nominated by the community in module II should introduce itself and explain the aims of the community initiative and explore possibilities for support and cooperation. The community delegation could be the community representatives (the implementation team) and, if possible, the village staff or community volunteers could accompany them.

5.4.2. Step 2 : Develop Guidelines for the Questionnaire

In order to have relevant information related to clean water supply, guidelines should be developed. The contents of the guidelines are based on the data that will be collected from each key informant. Annex 3 provides an example of guidelines for conducting a questionnaire with the public water company in Jakarta including a brief sample questionnaire.

In the case of assessing effective demand for water, the guidelines will consist of questions related to the provision of water supplies.

The questions for the water provider (public water company) will focus on the construction costs, connection charges, operation and maintenance costs and regular user charges.

Table 8: An example of questions for the selected key informants

No	Key informants	Questions
1.	The local authority (Head of village)	- the city plans for the area (road, housing, water) - intersectoral involvement for the provision of clean water - support needed
2.	The City Public Water Company	- the policy of the company in regard to the provision of water in general - construction costs - connection charges - operation costs - maintenance costs - regular user charges - other possible sources of connections (i.e. community group hydrant)
3.	The City Public Work Office	- planning for the area (road construction, drainage etc) - the possibilities to cooperate the construction piped water
4.	The City Housing Office	- planning for the area for the next five year - the possibilities to cooperate in the construction of piped water
5.	The City Planning Office	- planning of the city for the next five years
6.	The Local NGOs	- NGOs activities - types of support that can be offered (funds, technical assistance) - how to submit proposals for cooperation - training that could be offered
7.	Research Centers/ Universities	- technical assistance that can be offered - how to submit proposal for cooperation - any available data
8.	Local Key Persons	- problems in water supply - resources available locally - mobilization local resources - community needs - types of participation from the community

5.4.3. Step 3 : Conduct interview and collect data

An interview is a technique or method used to collect information/data. The aim of this interview is to find data from the relevant departments for the provision of clean water and also the community resources and community needs from the local key persons. Basically, the source of information (the key informants) are directly interviewed by using questionnaires. Interview is done in a face-to-face encounter where questions are posed and answers provided.

There are four main factors that are needed to support the success of an interview:

a. The interviewers.
b. The key informants.
c. The topic of the survey.
d. The situation of the interview.

From these four factors, the interviewer is the most important because he/she could influence the other three factors. Thus, the interviewer should be a dynamic character.

The interviewers should be able to understand the topic of the survey/interview as outlined in the questionnaire/guideline, and be able to explain the questions clearly.

Several procedures for an interview should be taken into account, as follows :

a. Set an ideal time for visit;
b. Make an appointment with the key informants;
c. Try to visit in person;
d. Conduct interviews personally;
e. Interviewer should introduce him/herself and explain the purpose of their visit, and request key informant willingness to be interviewed.

Most appropriate methods of data collection should be used to retain all the data that has been collected from the key informants will be stored and analysed in step 4.

Annex 4 provides an example of data gathered on tariffs and costs of rates from the water company in Jakarta.

5.4.4. Step 4: Store and analyse data

After conducting the interview the data should be stored and analysed qualitatively. It will therefore be essential to be selective, and only to analyse and interpret that minimal data which is necessary for meeting the set objectives (assessing effective demand for environmental infrastructure). There should be a correct interpretation of factual information gathered. The limitation and drawbacks of the data and its interpretation will have to be discussed, and alternative explanations of the findings will be proposed, whenever justified.

If available, an appropriate software package that is a combination of spreadsheets and word-processing could be used for storing and analysing the qualitative data.

5.4.5. Step 5 : Provide data for module IV and V.

Data that has been collected should be used as an input for developing a questionnaire for module IV on community self-survey and module V on community group activities. Especially the information on tarriffs and costs for installation, operation and maintenance are of importance.

6. COMMUNITY SELF-SURVEY/ SELF- REPORTING

6.1 Introduction

A community self-survey is an activity relating to data collection, analysis and presentations that will be conducted by the community itself. A precondition for a community to successfully conduct community self-surveys is training. The methods of CSS could be through interviews, observation or group discussions. All those activities cannot be executed by the community without initial support. At the beginning, there is still a need for facilitators, for instance to provide guidance on how to develop questionnaires, or to conduct analysis and interpretation of data.

6.2 Objectives

The objective of this module is:

- to enable a community to conduct a community self-survey and self-reporting on the willingness and ability of households to pay for a preferred environmental infrastructure technology service.

6.3 Strategy and Expected Output

6.3.1 Strategy

For community volunteers to do fairly well in the process of data collection, analysis and presentation, training sessions will have to be held. This will enable them to conduct community self-surveys and demonstrate this process to other neighbouring communities.

A structured questionnaire will be used as a tool of data collection. The community self-survey will be conducted by selected trained community volunteers by visiting each household of a neighbourhood at regular intervals.

6.3.2 Expected Output

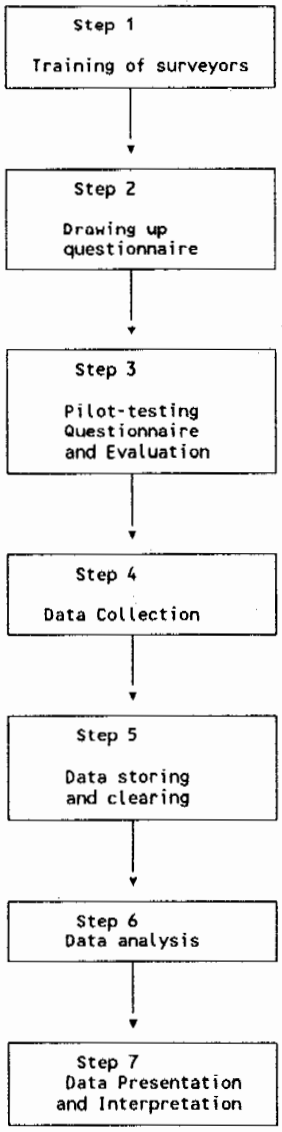
The community self-survey would enable the community to acquire relevant data related to water (willingness and ability of households to pay for water). Key information on willingness to pay for water would be:

- Household characteristics
- Amount of water consumed per day per household
- Amount of water used for household activities per day
- Total number of households having access to specific water supply technology
- User satisfaction with the services provided
- Costs of water paid by household per day
- Capability of household to pay for water
- Amount of water households would like to consume
- Willingness of household to pay for water

- Preference of selected technology

6.4 Steps of Activities

The following steps could be followed:



6.4.1 Step 1: Training of Surveyors

* Objectives of the training

The aim of the training is to train the local community volunteers who have been selected, in order to improve their knowledge and skill on how to conduct a community self-survey in relation to environmental infrastructure, for instance assessing effective demand for water (willingness and ability to pay for clean water) by collecting, storing, analysing, interpreting and presenting data.

* Participants

The participants in the training will be the local community volunteers.

The selection of the community volunteers as interviewers should be based on certain criteria such as:

- can they can read and write?
- are they hard-working and have dedication?
- are they willing to work as volunteers?
- are they accepted in their community?
- do they have enough time to do voluntary work?
- are they permanent residents in that neighbourhood?

Besides the above mentioned criteria, interviewers should be able to:

- enhance good relationships with local community;
- comprehend, experience, understand and interpret community needs, although they are not expressed clearly;
- motivate the community and mobilize community participation, especially related to improvement and development activities.

* Facilitators

The facilitators could be local people, for example from the environmental health sector, or other sectors related to environmental infrastructure. External agencies such as NGOs, universities, research centres that have technical know-how could provide technical assistance.

* Contents of the training

The training could focus on the following:

- How to conduct an interview (see Annex 5: Interview Guideline);
- How to design a questionnaire (Annex 6; Sample questionnaire in Annex 7);
- How to group data and fill in the tables (Annex 7; How to tabulate data)

* Location and time of the training

It is an advantage to organise the training within the community, for instance at the community or village hall to safeguard easy access for most of the participants.

Most community volunteers are usually housewives who have to tend to their own household activities (cooking, washing, taking care of children etc.). It is recommended that the time for training should be after they have finished their domestic activities. Late morning, between 10.00 to 11.00 a.m. and 15.00 p.m. is usually the most appropriate.

* Preparatory activities

For the success of the training, good planning and preparations need to be undertaken by the community self-survey (CSS) team prior to data collection.

Several preparatory activities should be undertaken by the CSS team, especially by the community volunteers under the supervision of the facilitators.

- the community volunteers together with the volunteers and other key persons should identify and select the new candidates for training, who have been recommended by the chairperson of each neighbourhood;
- the community volunteers should assist the team to prepare the training materials;
- the community volunteers should help to distribute the invitations to the participants; at least five days before the training sessions begins;
- the community volunteers should help the training team prepare the room for training, e.g. organise chairs, tables, blackboard or flipcharts, writing materials, (notebook, pencils and eraser), participants attendance sheet, etc.

6.4.2 Step 2: Drawing-up questionnaire

When developing a questionnaire the following considerations should be kept in mind (Reynolds et al 1988):

1. Communities do not usually understand rates, ratios and percentages. They understand counts, and all indicators should be simple counts (e.g. number of houses with piped water supply).

2. Communities do not usually understand sampling, and will want all households included in a survey.

3. Communities and groups can be expected to be at different levels of development and sophistication in conducting self-surveys.

The questionnaire can be presented in a standard survey form or as a cartoon questionnaire depending on the appropriates. Annex 7 contains an example of a questionnaire. The structured questionnaire could be developed by the community volunteers supported by the facilitators during a workshop. The cartoon questionnaire would require the inputs of a cartoonist.

6.4.3 Step 3: Pilot-testing questionnaire and evaluation

A pilot-testing of the questionnaire is essential to know whether the questions are understandable (clear enough both for the interviewer and the respondents) and the sequence of questions is logical.

The pre-testing is very important and should be done in close association with the intended target group.

A questionnaire should be devised in such a manner to allow for summarising feedback during the pre-test. Notes could be written on the questionnaire to identify problems with comprehension (interviewee and respondent), coding, and logical sequence.

Ideally, the interviewers should be involved in the pre-testing, perhaps as part of their training. Their feedback can be very helpful in making revisions.

Based on the findings of the pre-test, a revision should be made to some questions in terms of linguistics and logical sequence. At minimum, five to ten households should have been involved in the pre-testing of the questionnaire.

The results should also be shared with the interviewers (community volunteers) during their briefing/training.

6.4.4 Step 4: Data Collection

Data on assessing the effective demand for clean water will be collected at the lowest aggregate possible, which will be at household level and in exceptions at individual level. Data will be collected by the community themselves, thus it will have to be limited in quantity and frequency.

* Community level data will include geographical data on settlements, name, location, settlement layout, etc.
* Household data will focus on data related to water.

The environmental health indicators developed in CEMIS module 2 could serve as a useful checklist of data collected for assessing effective demand. The field work will be carried out by visiting all households in the neighbourhood.

Data will also be collected through observation (if possible).

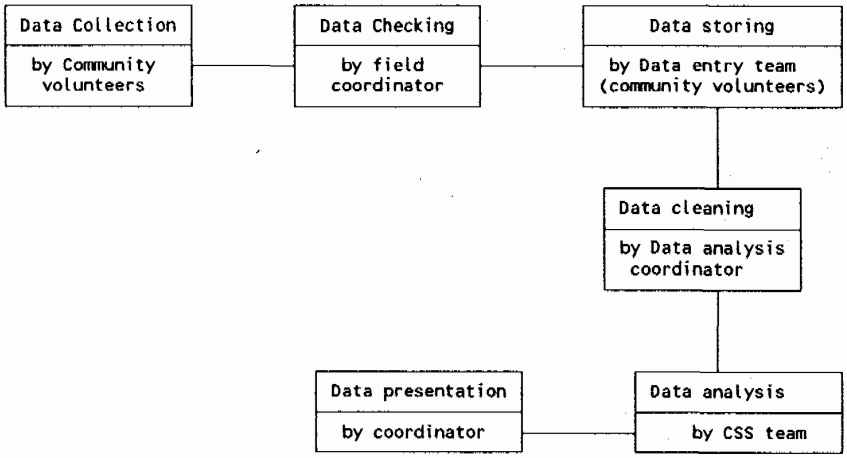
- First, the water sources in question will be observed. These observations will be recorded and checked against the information given by respondents.

- Secondly, observation will be made on the kinds of services provided.

6.4.5 Step 5: Data storing and cleaning

The data needs to be "stored" to ensure that no mistakes were made in summarising the totals and transferring them to the summary sheets. This can be done by having two separate teams independently summarise and transfer all of the data to summary tables. The results are then compared. Discrepancies can be checked and corrected fairly easily this way.

Figure 7: Flow of data collection and analysis



"Cleaning" the data involves correcting mistakes in summary sheets etc. Although the surveyors should have checked each questionnaire and cluster register (group of questionnaires), mistakes can still happen.

Typical mistakes include:

- using the wrong code
- leaving a question blank
- misinterpreting a written code
- skipping to the wrong question
- entering an answer in the wrong space

Some of these mistakes should be checked and revealed by the coordinators, others come out through the verification process, and some will not be noticed until the preliminary analysis is done. To find the source of the error, one would usually have to go step-by-step back through the data entry process: first to the summary sheets, then the cluster forms, then the original questionnaire or registers. Annex 7 provides an example of how to record and tabulate data based on a sample questionnaire.

6.4.6 Step 6 Data analysis

The collected data will be analysed and interpreted in a workshop attended by the community self-survey team and independent facilitators.

When the interviewers have completed the tables, they should review them critically and be stimulated to think about them in terms of different kinds of interpretations. There is likelihood that data collected will be more abundant then would be required for analysis.

All the facts will be put together around the key questions developed. The relevant information will be processed and put in other usable forms such as tables, charts, etc.

6.4.7 Step 7: Data presentation and interpretation

A final report will be prepared by the community self-survey team. A meeting that will be attended by representatives from the community and local government/water utility, will be held in which the report will be presented. The report will be presented in a simple and easily understandable language to the community. It will be an elaborate report submitted with a discussion of relevant points and recommendations for action.

7. COMMUNITY GROUP ACTIVITIES

7.1 Introduction

This module looks at the community group activities. This will supplement and enrich the information that has been collected through community activities with selected key informants and through a community self-survey. The activities start with the training of the facilitators. The training is needed to improve the knowledge and skills of the facilitators on how to conduct group activities, i.e. voting, ranking and bidding. The use of each method depends on the topic that will be discussed. As community group activities tend to be quite complex, the services of experienced trainers will be needed. These could come from external agencies such as universities, research institutions or NGOs.

7.2 Objectives

The objective of this module is:

To supplement and enrich the information acquired through key informants and CSSs with community group activities, such as bidding games, ranking and voting.

7.3 Strategy

7.3.1 Activities

- A training session for the facilitators in all of the three activities to be conducted in the community is needed. The services of expert trainers are envisaged here.

- An implementation plan for the activities could be conducted. The selection of the methodology to be used should be based on the topic that will be discussed.

- The participants will be community representatives (who are users), the local key persons, neighbourhood and other agencies related to the provision of environmental infrastructure such as the public water company.

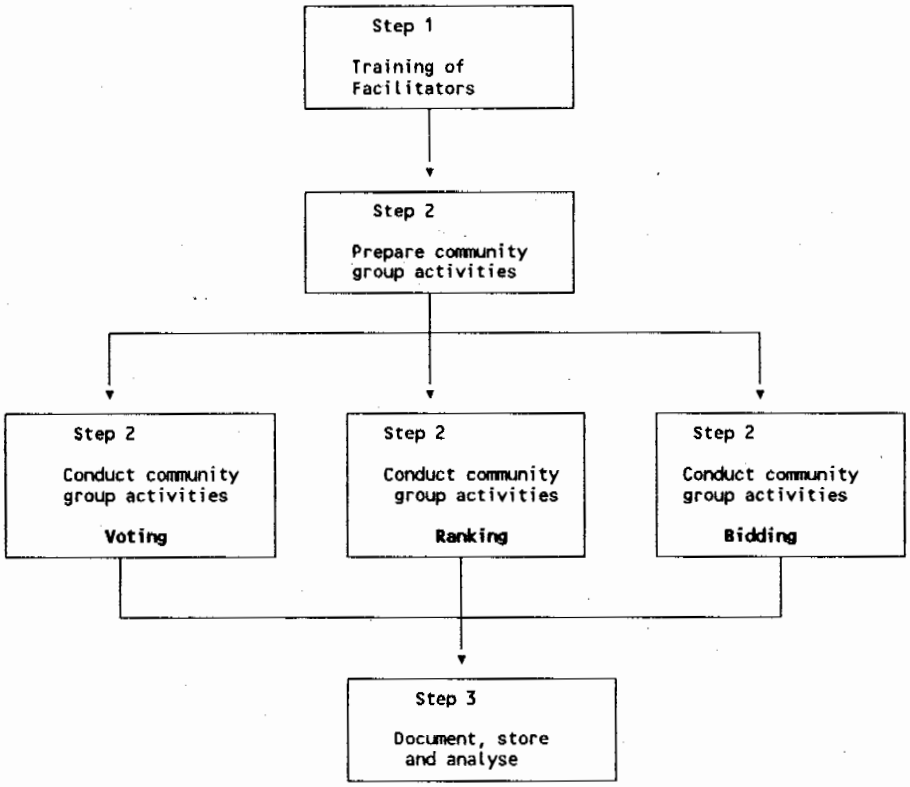
7.3.2 Expected Outputs

- The trained facilitators should be able to guide the community in voting, ranking or bidding games;

- Information showing the willingness of the community to pay for a selected environmental infrastructure component.

7.4 Steps of activities

The following steps could be followed:



7.4.1 Step 1: Training of Facilitators

In this context, facilitators refers to persons from the community who will guide/facilitate the group activities, such as ranking, voting or bidding. The facilitators could be selected local key-persons or community volunteers who have the skills to facilitate group activities. The facilitators will be trained by experts from NGOs, universities or research centres, and other related institutions that have experience in that area.

7.4.2 Step 2: Prepare and conduct community group activities

Community group activities could be conducted at different aggregate levels, at neighbourhood levels, groups of neighbourhoods or the whole community. Three types of group activities (voting, ranking and bidding) could be conducted based on findings from the key-person interviews (module III) and the community self-surveys (module IV).

The management team responsible for the overall planning should decide which one or combination of the three methodologies is most appropriate to use. As they need external inputs, these should be safeguarded when preparing for the group activities.

7.4.2.1 Voting

The result of the key person-interview and community self-survey could be several technological choices. All the possible answers/choices could be written on a flip chart by the facilitators, and the participants could vote for the most appropriate method they prefer.

An example would be type of water connection, and related construction costs where the participants could vote for the most appropriate type of water connection and related costs.

Table 9: Example of voting for type of water connection

Type of water connection and costs	Votes
individual connections US $ xxx	2
shared yard connection US $ xx	8
standpipes US $ x	0
Total	10

7.4.2.2 Ranking

By listing the several choices on a flipchart, the participants will be able to select one or two options, and then rank the results based on the total number of choices.

Simple ranking activities can elicit preferences from both individuals and groups. A combination of all individual rankings, will provide á group ranking.

A practical example for ranking could be on technological options of water supply and related costs, where all the participants could rank the choices depending on their financial situation. A summary ranking (group ranking) will be done after all the participants have finished ranking them individually.

The following is an example of preference ranking: For example three technical options for water supply could be offered to the participants (in-house connections, communal/yard tap or public stand post). Each participant should rank each item based on their own choices. If 10 participants attended this discussion, the results are reflected in the following tables:

Table 10: Example of Ranking

No. Name	Individual connections 1 2 3	Shared house connections 1 2 3	Public stand points 1 2 3
1. Sartono	1 - -	- 1 -	- - 1
2. Agus	- - 1	1 - -	- 1 -
3. Amir	- 1 -	1 - -	- - 1
4. Anton	1 - -	- 1 -	- - 1
5. Budi	1 - -	- 1 -	- - 1
6. Farid	- - 1	1 - -	- 1 -
7. Gani	- 1 -	1 - -	- - 1
8. Pardi	- 1 -	1 - -	- - 1
9. Salim	- - 1	1 - -	- 1 -
10. Wisnu	1 - -	- 1 -	- - 1
TOTAL	4 3 3	6 4 0	0 3 7

Water technology	Ranking 1	2	3	Total
1. Individual connection	4	3	3	10
2. Shared yard connection	6	4	0	10
3. Public stand post	0	3	7	10

This result shows that shared yard connection received the highest ranking with 60% of the participants choosing this option.

7.4.2.3 Bidding

In bidding games, a series of offers are made to the participants in an attempt to guide them to arrive at the maximum amount of money they are willing to pay for water.

At the start of the group activities, the nature and purpose of the meeting has to be briefly described.

During this group activity, several topics could be discussed:

- characteristics of households who are interested and the environmental conditions in which they currently live (economic status of the household, land tenure)
- existing water sources
- the actual water company prices and connection costs

- the ability of the community to pay in terms of construction costs and payment for monthly water bills;

- the willingness to pay in instalments.

The following provides an example of a bidding game for water connections starting with high charges.

Box 5: Example of bidding game for water connections: (monthly charges)

Suppose the Jakarta City Public Water Company was willing to connect and construct piped water to your community and the cost of connecting the piped water is Rp. 175.000,- (installation costs) and the monthly charges for water are Rp. 10,000,- would you be willing to connect?

(a) If you were asked to pay Rp. 175,000 as the cost for water installation, would you want to connect water to your house, or would you prefer to continue getting water from your present source of supply (vendor)?

YES (want to have connection) _____ If yes, go to (c)
NO (do not want new connection) _____ If no, go to (b)

(b) Suppose that instead of Rp. 175,000, the installation costs are Rp. 150,000. Would you want to have connection?

YES (want to have connection) _____ go to (c)
NO (do not want new connection) _____

(c) What is the most you would be willing to pay per month to have a new water connection?

Maximum payment in Rp.

This bidding game can be repeated for the monthly charges.

7.4.3 Step 3: Documenting, storing and analysing information

All the data from the group activities should be documented, stored and analysed.

A secretary is needed for the group activity. He/she is responsible for documenting all the processes and results of the discussion. If a computer is available, the data could be stored in a computer using a word processing programme. The data could be analysed qualitatively, in the form of text.

8. CONSENSUS BUILDING AND COMMUNITY CONTRACTS

8.1. Introduction

When evaluated, many projects fail to be sustainable as too little attention is given on how to create or strengthen existing institutional structures which are necessary supportive environments for sustainable development. It is due to this weakness in planning (a top-down planning instead of bottom-up-planning), lack of community participation, and weaknesses in monitoring systems that most projects become unsustainable after being implemented.

To have a sustainable project/programme, good planning should be supported by good information systems.

Participation and contribution from related local authority departments will enhance the success of the implementation of the project.

Consensus and commitments between the community and the related agencies is very important to ensure that the sustainability of a project will be achieved.

8.2. Objectives

The objective of this module is :

- To bring together and consolidate the results from various community activities;
- To build consensus on the various issues of willingness and capability to pay for preferred environmental infrastructure services/technologies;
- To find a solution on conflict resolution;
- To develop community contracts.

8.3. Strategy and Expected Outputs

8.3.1. Strategy

A workshop could be conducted which is attended by the community representatives (especially the users), local key-persons, local authority, related agencies, or NGOs. Other related sectors i.e. city planning office, the public works department should also attend at a later stage.

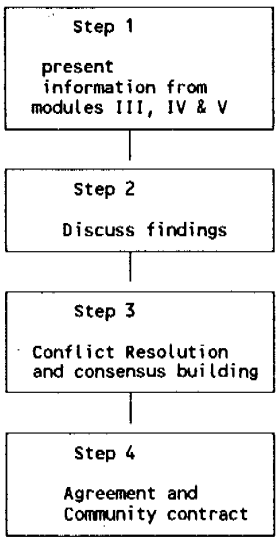
The community could first build consensus amongst themselves and then discuss the findings of the community-based initiative with the related local authorities and come to a consensus with them.

8.3.2. Expected Outputs

- A consensus amongst the community members and the related agencies (for example the public water company to implement a specific environmental infrastructure programme;
- A Memorandum-of-Understanding (MoU) for community groups and between the community and the related agency.

8.4. Steps of Activities

The following steps could be followed:



8.4.1. Step 1 : Present information from modules III, IV & V

Selected important information from module III (key-informant interviews), module IV (community self-survey) and module V (community group activities) will be presented at this workshop

If provision of water has been selected as the community project, important information that should be presented at this workshop are as follows :

1. Results from key-person interview (module III), with the public water company.

   - construction cost
   - connection charges
   - operation and maintenance costs
   - regular user charges
   - possibility to connect

2. Results from the community self-survey (module IV)

   - the amount of water needed;
   - the total number of household who are willing to have new water connections;
   - how much the households are willing and able to pay for :
     * new connections
     * monthly bill payments

3. Results of community group discussion

   - through voting, the neighbourhood has decided which types of water connection they prefer and how much they are willing to pay for.
   - through bidding games, the neighbourhood has chosen the monthly bills they are willing to pay, for a certain quality of services and how much they can pay for connection charges.

8.4.2. Step 2 : Discuss findings

At first, the community should discuss the findings amongst themselves, as the services offered by the city public water company are not always in line with the community needs. A discussion between the community as the client and the city public water company as the provider is needed to reach a consensus.

During the workshop several alternatives to solve the problems encountered should be discussed, for instance if the community lacks funds.

- the community could mobilize the available local resources such as contributions in-kind

- negotiations between the community and the city public water company.

8.4.3. Step 3 : Consensus building

To have a sustainable project, a consensus amongst the community and between the community and the provider of services should be built on:

- type, quantity and quality of services needed (individual, public hydrant, shared house piped water)
- methods of payment (monthly bill or cooperative etc.)
- how to meet the demand on side of local authority.

8.6.4. Step 4 : Agreement and Community contract

The community contract/agreement should include :

- the rights and responsibilities of the community

- the responsibility of the city public water company
  * construction

    * maintenance
    * quality
    * continuity of the supply

- time schedule of paying the construction cost

- alternatives of payment

The following box 6 provides considerations for an example of a community contract.

Box 6: Considerations for a community agreement/contract

A contract/agreement between the community as consumers and the Public Water Company as providers is needed. This agreement is very important in order to clarify respective duties and responsibilities.

After the community has selected a specific environmental infrastructure, for instance, the installation of a shared water piped in a selected neighbourhood, an agreement should be made and signed by both parties.

In this agreement, several issues should be taken into consideration.

1. The consumers responsibilities

For instance, the shared water pipe would be utilized by 10 households in one neighbourhood. There should be a coordinator who will represent the whole group. The coordinator could be the head of the neighbourhood of the users.

Several responsibilities are;

* The community should pay the monthly bill routinely and on time;
* The community should pay the maintenance cost;
* The community should pay the administrative cost;
* The community should take care of the installation (tap, gauge/meter, distribution pipes).

If this is a new installation, the community should contribute towards the connection charges for the main pipe to their neighbourhood. The agreement should include:

* The amount the community would share/pay for the connection;
* The payment schedule for the installation charges.

2. The tasks of the public water company:

* Provide a reliable installation for the clean water;
* To routinely supply clean water;
* To provide sufficient water to meet the consumers demand;
* To provide good water quality (clean, tasteless, odourless);
* To provide good maintenance services (to check routinely).

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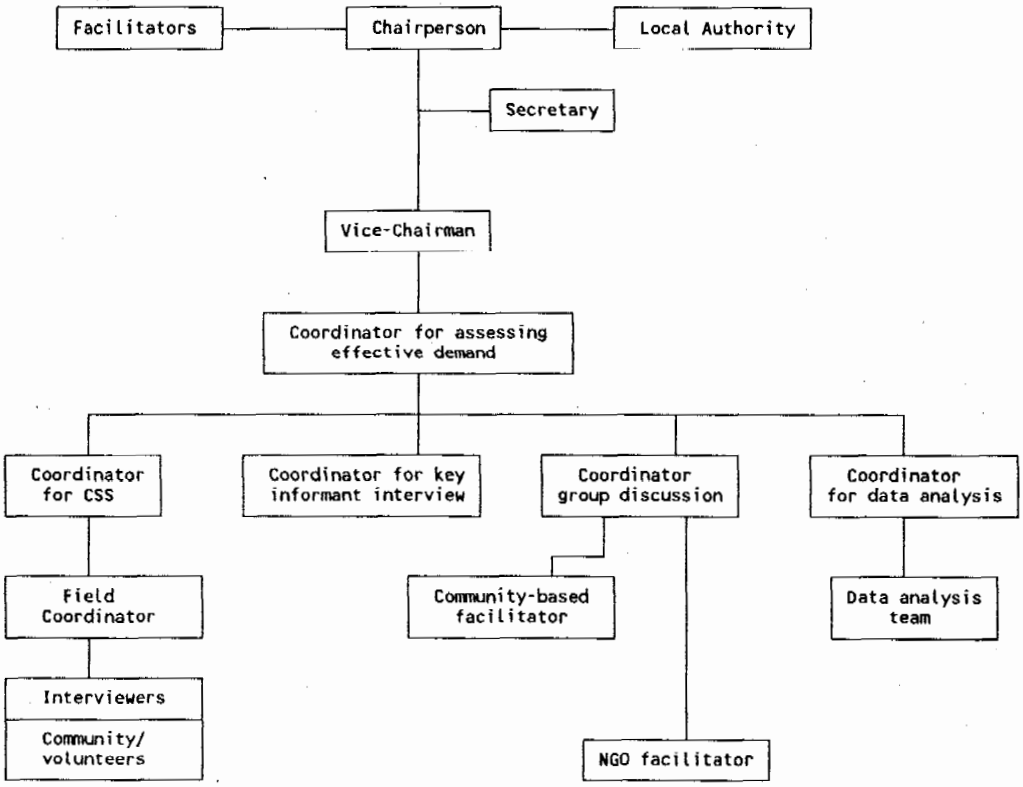
ANNEXES

Annex 1: Organisational structure for the management team responsible for assessing effective demand and information gathering



Task allocation for the management team of data collection

The above organisational structure can be simplified if the number of households to be covered is not very big. Coordinators for key informant interviews and group discussion could be conducted by only one individual who has experience in qualitative studies or has chaired meetings and seminars before.

During the initial phase, the community will not be in a position to conduct all activities by themselves. Occasional input will be required from external facilities.

Team composition

The management team will consist of the local community (including the local key-persons), the local authority and external agencies. The external agencies could be from the academic field (universities, research centres), NGOs or international organisations. They could work in the project on a part-time basis as consultants/facilitators. They could as well act as

specialists or experts and assist in the planning and implementation process (monitoring, evaluation) of the project or training sessions (see the organisational structure).

Role and responsibilities

The different actors shall have their specific roles/duties and responsibilities well spelt out to avoid duplication of work.

1. FACILITATORS

1.1 Persons

The facilitators could be from universities, research centres or NGOs or other agencies available.

1.2 Duties

- To provide consultation or technical assistance in:
  - planning and implementation of the project;
  - monitoring and evaluation of the project;
  - training.

- To provide financial assistance.

2. CHAIRPERSON

He/she would act as the project director. The chairperson should come from the community and be elected by the community. He/she could be the local leader/key-person who has the capability to head a community-based organisation.

2.1 Duties

- Plan and develop strategies for the implementation and management of data collection;
- Oversee and coordinate the overall implementation;
- Supervise the administration;
- Serve as liaison officer to the local authority and other external agencies;
- Evaluate and monitor the project;
- Hold meetings.

3. VICE-CHAIRPERSON

The Vice-chairperson could be local key-persons or community representatives such as the head of a neighbourhood.

3.1 Duties

- Help the chairperson in managing the project;
- Represent the chair-person's duties on a specific occasion.

4. SECRETARY

Community representatives from welfare associations, NGOs or CBOs members of youth organisations, or housewives who have some spare time for social work, are suitable persons for this position.

4.1 Duties

- Take charge of the administrative matters;
- Outline/schedule the programme activities (training, survey, interviews etc.)
- Monitor and document various activities.

5. COORDINATOR FOR DATA COLLECTION

These can be taken from community volunteers or local leaders who have the capability and experiences in data collection. They can also come from the field staff from NGOs or CBOs field staff if a local person is not available.

5.1 Duties

- To coordinate all the data collection activities;
- To summarize the data;
- To consolidate the report on data collection and submit to the chairperson;
- To conduct a meeting with all coordinators.

6. COORDINATOR FOR A COMMUNITY SELF-SURVEY

For the community self-survey, an expert who has experience in conducting CSSs is needed to coordinate the CSS activities. He/she could be one of the community volunteers who have been trained in conducting a CSS.

6.1 Duties

- Supervise the field coordinators and/or the community volunteers during the implementation of CSS.

7. FIELD COORDINATORS FOR COMMUNITY SELF-SURVEY

Field coordinator is not always required, it depends on the total number of Households to be covered. For a small survey, the coordinator could also manage the activities in the field.

7.1 Duties

- One field coordinator should supervise about 5 community volunteers;
- To check the results of the interview;
- He/she has to be contactable in the field to assist the community volunteers.

8. COORDINATOR FOR KEY-INFORMANT INTERVIEW

He/she could be one of the community volunteers. Since the key informants (respondents) are the city level person, the interviewer should be the chairperson or the vice chairperson or other local key-person/leaders.

8.1 Duties

- To prepare a questionnaire for the key-person interview;
- To select the key informants to be interviewed;
- To schedule or make appointments with the respondents;
- To compile and report on the results of the interviews.

9. COORDINATOR FOR GROUP DISCUSSION

He/she could be the community volunteers who has capability in leading the focus group discussion. In carrying out these activities, he/she could be assisted by external facilitators. For the FGD activity, one or two secretaries would be required to take notes on the whole process.

9.1 Duties

- To plan the FGD activities (moderators of the discussion, participants, time, place, guidelines, etc.);
- To summarize and report on the results of the discussion;

10. COORDINATOR FOR DATA ANALYSIS

Due to the complexity of data analysis, facilitators from universities/research centres or government local agencies (for instance city health office) could be involved in this activity. The qualified community volunteers and coordinators could act as coordinators for data analysis..

10.1 Duties

- To identify members for the data analysis team;
- To organize and manage the related activities.

1. INTERVIEWERS/COMMUNITY VOLUNTEERS

The interviewers will be identified from community volunteers with certain required qualifications (see the criteria of interviewers). They could be health cadre members, housewives or school drop outs in search of employment, members of youth organisations etc.

In the process of collecting data, it is preferred that there should be no discrimination based on gender lines, since the data should be gender sensitive.

It would be advisable for every neighbourhood to identify one representative and one or two community volunteers.

11.1 Duties

- To conduct household visits, interview households and document the interviews.

12. DATA ANALYSIS TEAM

A team for data analysis should consist of community volunteers. For data analysis, facilitators would be required. The facilitators could come from the universities, research centres or the local community with experiences in data analysis.

12.2 Duties

- To clean the data;
- To tabulate the data;
- To analyse the data;
- To present the data.

Annex 2: Participatory planning methods

The Institute of Tropical Medicine Antwerp in collaboration with the Institute of Human Nutrition and Food - University of Philippines at Los Banos, and the Royal Tropical Institute of Amsterdam have developed a new approach for planning, monitoring and evaluating nutritional aspects of projects and programmes.

This concept/approach has been used in several countries of Africa, the Philippines and Indonesia.

This method is systematic, practical, comprehensive and participatory in terms of planning and evaluation. At the beginning it was used for nutrition projects or programmes. The experiences gained in the nutrition projects have been transferred to other areas such as environmental infrastructure.

The Participatory Planning Method consists of three approaches:

- Causal Model
- HIPPO-POC (Hypothetical Iinputs - Process - Outputs - Outcomes) table
- Dynamic model

The causal model would be used during the planning stage, while the construction of the HIPPOPOC Table and designing the Dynamic Model would be used during the evaluation stage.

DESIGNING A CAUSAL MODEL

A causal model is a simplified diagrammatical representation of the "real situation" on the ground. It is a communication tool used in identifying the causes and mechanisms of a problem under consideration.

In assessing and understanding a particular situation (for instance a given environmental problem), a certain number of variables are presumed to influence it either directly or indirectly. The causal model looks into a generation of factors that are presumed to have causal effects on the current problem. The design of this model is such that it can allow community members to understand the root causes of the problem and thereby provide a lasting solution to the identified problem.

Uses of the Causal Model:

* Situational analysis

The big advantage of using a causal model approach is that it leads to an understanding of the causal linkages between problems, with less serious problems given least attention. Another advantage is that the model can be reviewed and upgraded from time to time without interfering much, while at the same time it involves the community fully in all activities.

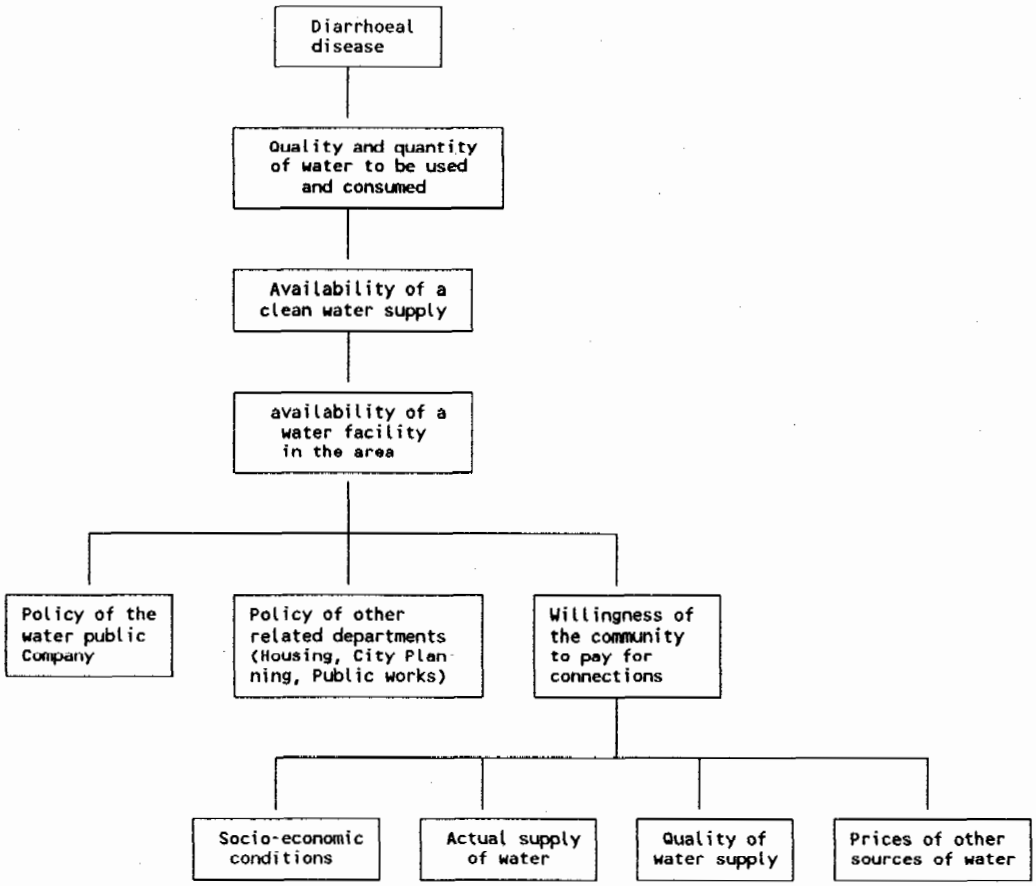
* **Identification of relevant interventions:**

Identification of relevant institutions and categorising them according to community projects and activities they undertake as they relate to interventions identified by the community..

* Evaluation:

- is a tool that ensures comprehensiveness; it gives a unique framework of reference based on "real life situations";
- gives an understanding of mechanisms which lead to a given problem and the identification of hypotheses to test;
- it assists in the assessment of the relevance of the interventions and the coherence of the programme;
- it facilities and helps to identify the confounding factors which are external and yet do influence the problems in question;
- it shows the limitations of the intervention and the roles of the different sectors.

CAUSAL MODEL OF WATER SUPPLY PROVISION



CONSTRUCTION OF HIPPOC TABLE

Often, the people involved in a project are faced with some constraints in terms of evaluation. Usually, confusion arises when the actual outcomes differ from the expected outputs and set objectives of a project.

In overcoming the above constraints, a tool which is simple and readily applicable for the evaluation of any integrated development programme could be used. This tool is called Hypothetical-Inputs-Process-Outputs-Outcomes (HIPPOPOC) Table. A HIPPOPOC Table consists of four columns; the inputs, the process, outputs and outcomes.

- The INPUTS consists of human, technical, material and financial resources invested into the project.

- The PROCESS describes the actions or steps to be undertaken to transform inputs into outputs;

- The OUTPUTS consist of all the results anticipated from the operational objectives of the project which are directly dependent on the programme;

- Thee OUTCOMES are a combination of actions undertaken by the project.

Uses of HIPPOPOC Table:

This table is simple, purely descriptive and provides evaluators with a clear, distinct and logically arranged overview of the different components of the intervention. The table also helps evaluators differentiate between outputs and outcomes.

Project/Activity	Input	Process	Outputs	Outcome
Installation of shared piped water connection	- Time - Labour - Construction - material pipe cement bricks sand - Appliances tap gauge meter - Place - Funds - Technical assistance	Community constructs the piped water connection	a shared pipe was available in neighbourhood 1 and 10 of Kalurahan Jati Pulo (Jakarta)	availability of clean water for 8 households

DESIGNING A DYNAMIC MODEL

Experiences from research have shown that there is a tendency for researchers or evaluators to collect voluminous and irrelevant data due to the lack of a consistent plan of data collection and data analysis. The end result is inefficiencies in data collection and complexities in data analysis. The time, and money spent in data collected without any assurance of the relevance of data gathered reduces efficiency. Such problems can be avoided by use of the dynamic model.

A Dynamic Model is a simplified and hypothetical representation of what is really happening in the project. It transforms the projects' outputs into outcomes through an intervention. It is a combination of operational and outcome approaches.

Characteristics and advantages of a Dynamic Model

a. In contrast to the causal model which is purely descriptive, a dynamic model shoes the transformation of the situation through an intervention;

b. It establishes prognosis of the positive impact of the project;

c. It permits one to define the scope of evaluation to be done and therefore it limits the field of evaluation;

d. It permits the identification of specific indictors and reduces thc collection of data to a necessary minimum.

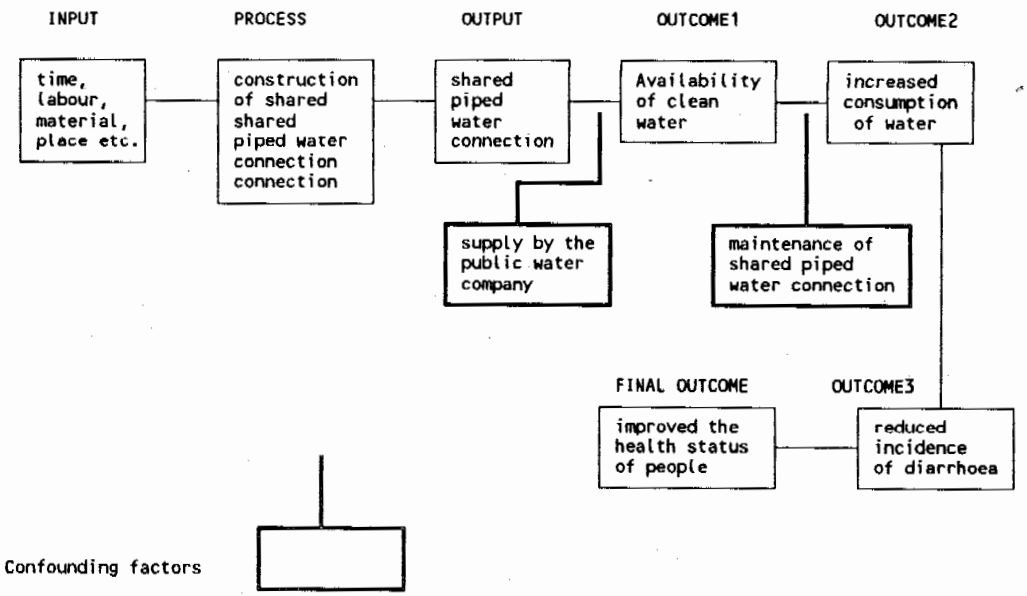
Uses of a Dynamic Model:

a. Defines limits of evaluation by helping evaluators to define the extent of the evaluation;

b. Operationalizes the concept of comprehensiveness in the evaluation;

c. Provides a tentative or provisional, although coherent explanation on how projects work-

EXAMPLE: DYNAMIC MODEL FOR EVALUATION OF SHARED PIPED WATER SUPPLY



Annex 3: Guidelines for an Interview with the Public Water Company in Jakarta

ATTENTION FOR THE INTERVIEWER

* First, the interviewer should introduce himself/herself: name, position from which community he/she comes from;
* Then explain the aim of the interview.,

---

1. CHARACTERISTICS OF KEY INFORMANT INTERVIEW

NAME : Mr. Sartono

POSITION : The Director of Jakarta City Public Water Company

ADDRESS :Jl. Penjernihan 11, Pejompongan, Jakarta

2. POLICY OF THE COMPANY

i. Is our area (Kerurahan Kali Anyar) included in the areas which will be provided with a new water connection next year?

ii. If not,

a. Why was our area not included in your plans for the new installation?
b. And when does your company intend to plan for our area?
c. If the plans are in the long run, is it possible for the community to participate by contributing in the installation of the new water facility?
d. What types of water installation could be provided by the company? (household connection, public hydrant).

iii. If yes (that means that this area will be covered with public water supply):

a. When will the installation process commence?
b. What is the area coverage (whole community or some neighbourhoods only)?

3. CHARGES

iv. Could you kindly explain how much the costs for constructing a new installation for each house would, if the City Public Water Company has already provided a main pipe adjacent to the neighbourhood?

v. Could you please explain how much the costs for constructing a new installation for each house would, if the main pipe is further away from the neighbourhood? It means that a distribution pipe would have to be installed.

vi Would it be possible for the community to have a shared pipe installation in contrast to individual connections?

vii. Could you provide us with estimates for maintenance costs?

viii. How much would the regular user charges be?

ix. Is there any other information that is important for us?

Annex 4: Example of costs and tariffs of the Public Water Company in Jakarta (Indonesia)

COSTS AND CHARGES FOR WATER

Cost and charges for water will consist of several components. The following provides an example from the Public Water Company in Jakarta (Indonesia):

1. Installation costs

The costs are differentiated between household and non-household users. The Jakarta City Public Company has the standard connection charges that are paid by the consumers.

1.1 The household users

- For the household users, the charges are based on standard connection charges. This can also differ depending on the size of the house.

- The consumer must pay for any additional connection pipe if the main pipe is too far away from the consumers house.

1.2 The non-household users

For the non-household users, costs differ depending on the users characteristics (social, non-commercial agencies, commercial agencies, industries, etc.). The diameter will also differ based on the diameter of the inlet pipe (inches) and the size of the building.

2. Maintenance costs

The maintenance costs refers to maintenance costs for the gauge meter. The price charged depends on the diameter of the inlet pipe. The size of the pipe varies from 0.5 inches (Rp. 1,000/month) to 16 inches (Rp. 110,000/month) (1 US $ is approximately Rp. 2200,-).

3. Administration fees

The administration fee refers to regular monthly charges/bills for paying the regular bill (Rp. 1,000/bill), hydrant, laboratory tests (Rp. 7,000/sample) etc.

4. Deposit

The consumers are required to deposit a given sum of money as a guarantee for the services delivered. For instance, the following deposits would have to be paid by:

- a household Rp. 25,000
- a small business Rp. 40,000
- a big company Rp. 200,000

5. Tariffs

The monthly charges also differ depending on the consumers characteristics and the amount of water used. The costs per meter cubic will depend on the amount of water consumed.

There are three categories for water charges:
0 - 30 cubic meters
31 - 50 cubic meters
> 50 cubic meters

Table I. Standard Connection Costs

Floor Area (square meters)			SCC (Rp.)
1	to	25	60,000
26	to	50	80,000
51	to	75	100,000
76	to	125	175,000
126	to	200	300,000
201	to	300	400,000
301	to	400	550,000
401	to	500	600,000
501	to	750	750,000
751	to	1,000	950,000

SCC = Standard Connection Cost
For floor area more than 1,000m, the connection costs will be calculated as proportional to the connection cost; 751 to 100,000 square meters x Rp. 10.

Table II: Connection Cost (CC) for households with Additional Connection Pipe

FLOOR AREA (Sq. meter)			Standard Connection Cost (Rp.)	Connection Cost (Rp.)
1	to	25	60,000	60,000 + ACP
26	to	50	80,000	80,000 + ACP
51	to	75	100,000	100,000 + ACP
76	to	125	175,000	175,000 + ACP
126	to	200	250,000	250,000 + ACP
201	to	300	300,000	300,000 + ACP

301	to	400	350,000	350,000 + ACP
401	to	500	400,000	400,000 + ACP
501	to	750	550,000	550,000 + ACP
751	to	1,000	600,000	600,000 + ACP

ACP = Additional Connection Pipe
For floor area more than 1,000 M, the Connection Cost will be calculated proportional from the Connection Costs for 751 to 100,000 Sq. meter x Rp. 10

II. Standard Connection Costs for Non-Household Group

COSTUMER GROUPS (Costumer Type)	WATER METER DIAMETER		Standard Connection Cost (RP. Sq. meter floor area)
	(Inches)	(mm)	Rp.
1. SOCIAL			
(Orphan homes	½"	13	650
Community Association	¾"	20	750
Charity Hostel	1" - 1¼	25 - 32	860
Government Hospital)	1½" - 2"	40 - 50	990
	2½" - 3"	65 - 75	1,050
	4"	100	1,125
	5" - 6"	125 - 150	1,215
2. NON COMMERCIAL			
(Consultants	½"	13	950
Government Agencies	¾"	20	950
Foreign Representative	1" - 1¼	25 - 32	1,000
Non profit organisations	1½" - 2"	40 - 50	1,100
(Inst./Univ.Course)	2½" - 3"	65 - 75	1,150
	4"	100	1,225
	5" - 6"	125 - 500	1,300
	8"	200	1,550
	10"	250	1,700
3. COMMERCIAL			
3.A SMALL			
3.A.1 (Small shop, small	½"	13	1,000
workshop, Home Industries	¾"	20	1,050
Small Business	1" - 1¼	25 - 32	1,100
Bather shop	1½" - 2"	40 - 50	1,500
Tailor, Clinic	2½" - 3"	65 - 75	1,200
Lawyer's office)	4"	100	1,300
	5" - 6"	125 - 150	1,400

3.A.2 (Private Hospital	½"	13	1,050
Polyclinic, Laboratory/	¾"	20	1,100
Private Pharmacy, Inn	1" - 1¼	25 - 32	1,150
Small Hotel	1½" - 2"	40 - 50	1,200
Beauty Parlour, Massage	2½" - 3"	65 - 75	1,250
Store House)	4"	100	1,350
	5" - 6"	125 - 150	1,470
	8"	200	1,610
	10"	250	1,770
3.B LARGE			
3.B.1 (Int.Hotel/Motel,	½"	13	1,250
Luxurious Apartments	¾"	20	1,500
Condominium, Steambath,	1" - 1¼	25 - 32	1,750
Night Club, Bar, Pub	1½" - 2"	40 - 50	2,000
Discotheque	2½" - 3"	65 - 75	2,300
Restaurants, Big work	4"	100	2,550
shop/Service Station)	5" - 6"	125 - 150	2,700
	8"	200	2,850
	10"	250	1,770
3.B.2 (Private Office	½"	13	1,100
(High Building), Bank	¾"	20	1,150
Convention Hall	1" - 1¼	25 - 32	1,250
(Show Room),	1½" - 2"	40 - 50	1,800
Hall	2½" - 3"	65 - 75	2,000
Cinema	4"	100	2,150
Theatre	5" - 6"	125 - 150	2,300
	8"	200	2,400
	10"	250	2,550
	12"	300	2,750
	14"	350	3,000
	16"	400	3,200
	18"	450	3,500
3.B.2 (Commercial building	½"	13	1,150
(Commercial business/	¾"	30	1,300
Departmental store)	1" - 1¼	25 - 32	1,375
	1½" - 2"	40 - 50	1,850
	2½" - 3"	65 - 75	2,100
	4"	100	2,250
	5" - 6"	125 - 150	2,500
	8"	200	2,700
	10"	250	3,000
4. INDUSTRY			
4.A (Small Industries)	½"	13	1,100
	¾"	20	1,250
	1" - 1¼	25 - 32	1,450
	1½" - 2"	40 - 50	1,900
	2½" - 3"	65 - 75	2,100
	4"	100	2,300
	5" - 6"	125 - 150	2,500
	8"	200	2,700
	10"	250	3,000

4.E (Big Industries, Ice	1" - 1¼	25 - 32	2,000
Factory, Food/Drink	1½" - 2"	40 - 50	2,250
Chemical Factory/Drugs/	2½" - 3"	65 - 75	2,400
Cosmetic, storehouse	4"	100	2,600
Textile	5" - 6"	125 - 150	2,950
Factory, etc.)	8"	200	3,150
	10"	250	3,350
	12"	300	3,550
	14"	350	3,800
	16"	400	3,950
	18"	450	4,200
	20"	500	4,500

2. MAINTENANCE COST OF THE METER GAUGE PER MONTH

½	inch	Rp. 1,000
¾	inch	Rp. 2,000
1	inch	Rp. 2,500
1 ½	inch	Rp. 5,000
2	inch	Rp. 9,500
3	inch	Rp. 12,000
4	inch	Rp. 17,000
6	inch	Rp. 20,000
8	inch	Rp. 25,000
10	inch	Rp. 30,000
12	inch	Rp. 46,000
16	inch	Rp. 110,000

3. ADMINISTRATIVE FEE

1.	Regular fees	Rp. 1,000/bill
2.	Special fees (Public Tap)	Rp. 7,500/bill
3.	Change of name	Rp. 17,500/bill
4.	Fees for sealing meter	Rp. 7,500/bill
5.	Testing of meter on demand	Rp. 20,000/bill
6.	Laboratory Examination	
	a. Non Commercial	Rp. 7,000/sample
	b. Commercial	Rp. 30,000/sample
7.	Replacement of records card of meter	Rp. 7,000/bill

4. DEPOSIT

A.	Household	Rp. 25,000/Cost
B.	Small business	Rp. 40,000/Cost
C.	Commercial business	Rp. 200,000/Cost

Note

Household division:

1. Household type A (for a very simple house, a house with several stories by Government)
2. Household type B (for low-income house)
3. Household type C (for middle-income house)
4. Household type D (for high-income house)

Annex 5: Interview guidelines

1. INTERVIEWER'S CODE

* Be completely honest in your work.
* Be reliable and conscientious.
* Be completely objective in manner.
* Be accurate and neutral in asking and recording answers to questions.
* Write the responses fully and legibly.
* Be understanding, patient, but do not prod or lead the respondent. Never suggest an answer.
* Be presentable: neat, groomed, clean.
* Be prepared - read and understand the questions and responses.
* Be neutral. Don't show reactions, emotions, agreement, or disagreement with responses. Don't give your opinion.
* Repeat a question if the respondent doesn't understand it.
* Use an informal, casual manner when asking the questions. Try to build rapport and trust. Avoid appearing to be superior, more intelligent, judgemental, or impatient.
* Don't share the responses with others : neighbours, relatives. The information has to be kept confidential.
* Keep note of any problems or unexpected reactions that may occur during the interviews. They may help to improve the survey findings.

2. INTERVIEWERS ASSIGNMENTS

To have good results of the interview, several procedures should be taken into consideration when voting with community volunteers.

* Assign a workload that can be easily completed within a given time.
* Don't assign too many households to one community volunteer.
* Assign each interviewer to a clearly defined neighbourhood.
* Assign interviewers to different but not far neighbourhoods from where they reside.
* Prepare the assignments before sending the interviewers to the field.
* Make sure that the interviewers know exactly where they have to go and what they have to do.

3. RESPONSE TO "DOESN'T KNOW ANSWER"

In many interview situations, the respondents may often answer questions by replying "don't know" especially where they are not sure. Whenever "don't know" answers occur for a question which requires "don't know" answer, it is alright. However, if the question needed a different answer instead of "don't know", then the interviewer should not proceed to the next question. It would be wise for the interviewer to consider the following:

There are several reasons why respondents give "don't know" answer

- the respondent does not understand the questions given by the interviewer and to avoid that he/she opts to answer "don't know";
- the respondent is willing to answer but he/she feels that by keeping the interviewer waiting, then he/she is inconveniencing him/her;
- the respondent fears to express his/her opinions, because the question is too personal, so the respondent tries to hide his/her real opinions;
- the respondent doesn't know the answer, therefore the "don't know" answer is the real answer;

However, the interviewer needs to observe and identify the reasons behind the "don't know" answers. For that reasons the interviewer needs to explain each question clearly, give time for the respondent to think, motivate and ensure the respondent understands the question before answering it.

Annex 6: How to design a questionnaire

* Questionnaire

The questionnaire's layout on paper is important for both the interviewer and the coder.

- The questions should be clearly separated from each other;
- The categories response should be clearly and easily distinguishable;
- Instructions to the interviewer should be clearly distinguishable from the questions so that the interviewer knows which items to read and those not to the respondent;.
- Questions and pages should be properly numbered so as not to confuse the interviewer.

One of the easiest methods to use would be the "Matrix" format for a cluster register, which allows 7 - 30 interviewees to be entered on a single page. This can best be done by having a questionnaire sheet for the interviewer accompanied by a separate matrix-like tally sheet on which to record all the responses. A questionnaire could also contain cartoons to ask questions.

*** Question construction**

Most survey questions are constructed to permit "yes/no" responses. Multiple choice questions can be analysed as "yes/no" questions if they can be recorded. This type of question may require further probing by the interviewer as well as an assessment of the appropriate responses.

For example, in the case of " Do you know what is meant by clean water ?" the interviewer would need to know the correct response and would then record it as "yes", meaning the respondent "does know" what it means, or "no", he/she does not know what it means.

Responses should be mutually exclusive. That is, there should be no overlap between responses, to avoid confusion. Be especially careful with age and multiple choice questions.

*** Screening questions**

Sometimes it is necessary to include questions that are not going to be analysed but which are necessary in order to determine if a respondent should be asked the next series of questions.

*** Marking responses**

The model instruments provide spaces that the interviewer checks to indicate the response. Options include circling the code of the response, using an X to cross it out, and writing in the code.

*** Sequence of questions**

Questionnaires are usually designed with an opening statement to be read by the interviewer to the respondent.

This statement usually explains :

- what the survey is about;
- who is sponsoring it;
- why it is being conducted;
- how the respondent was chosen to be interviewed;
- how long the interview will take;
- assurance that the responses will be confidential;
- a request for permission to begin asking the questions.

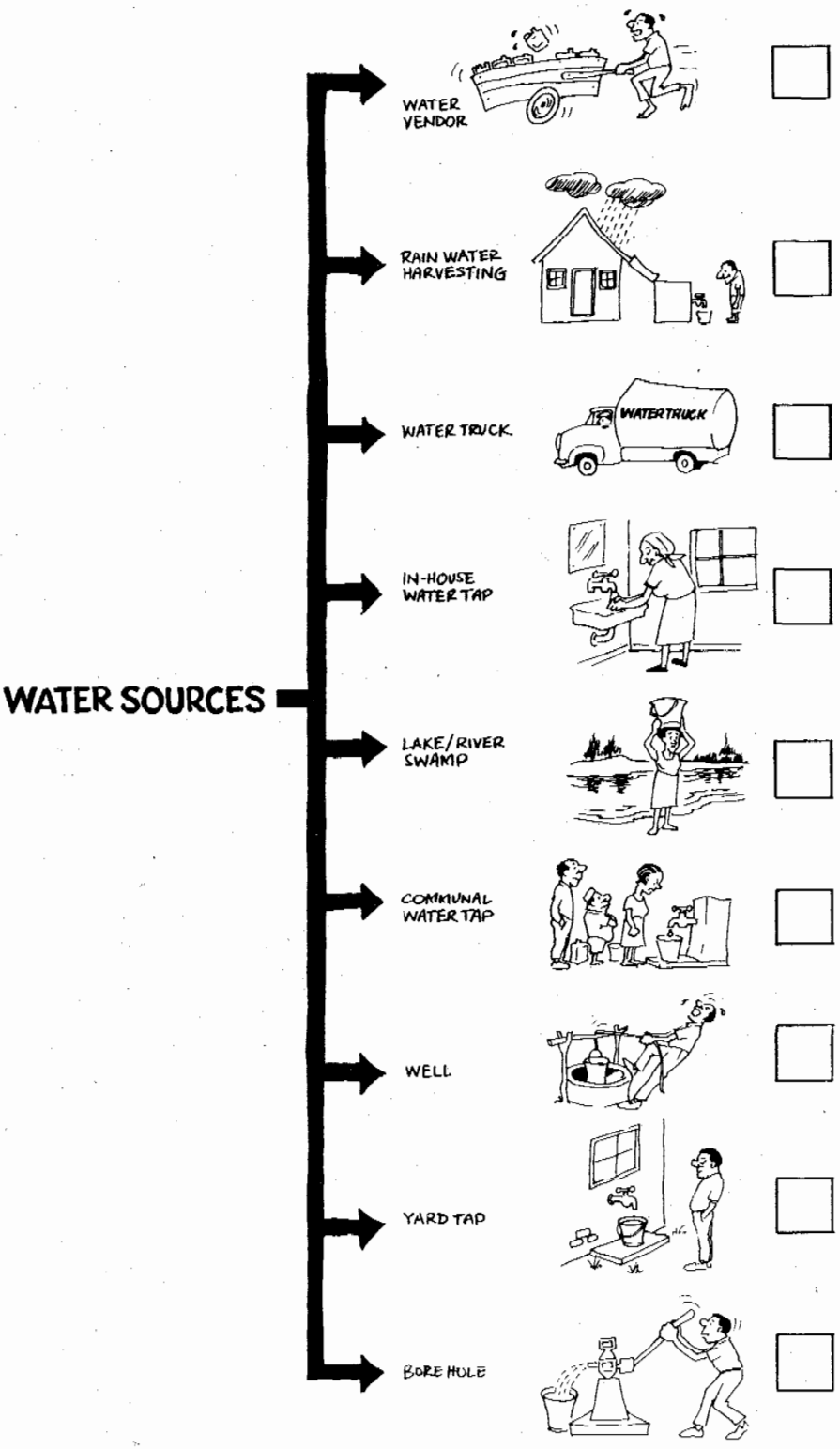
This statement can be written on each questionnaire or on a separate card that the interviewer carries. The questions should follow a logical sequence.

Annex 7: **Sample Cartoon questionnaire for Community Self-survey**

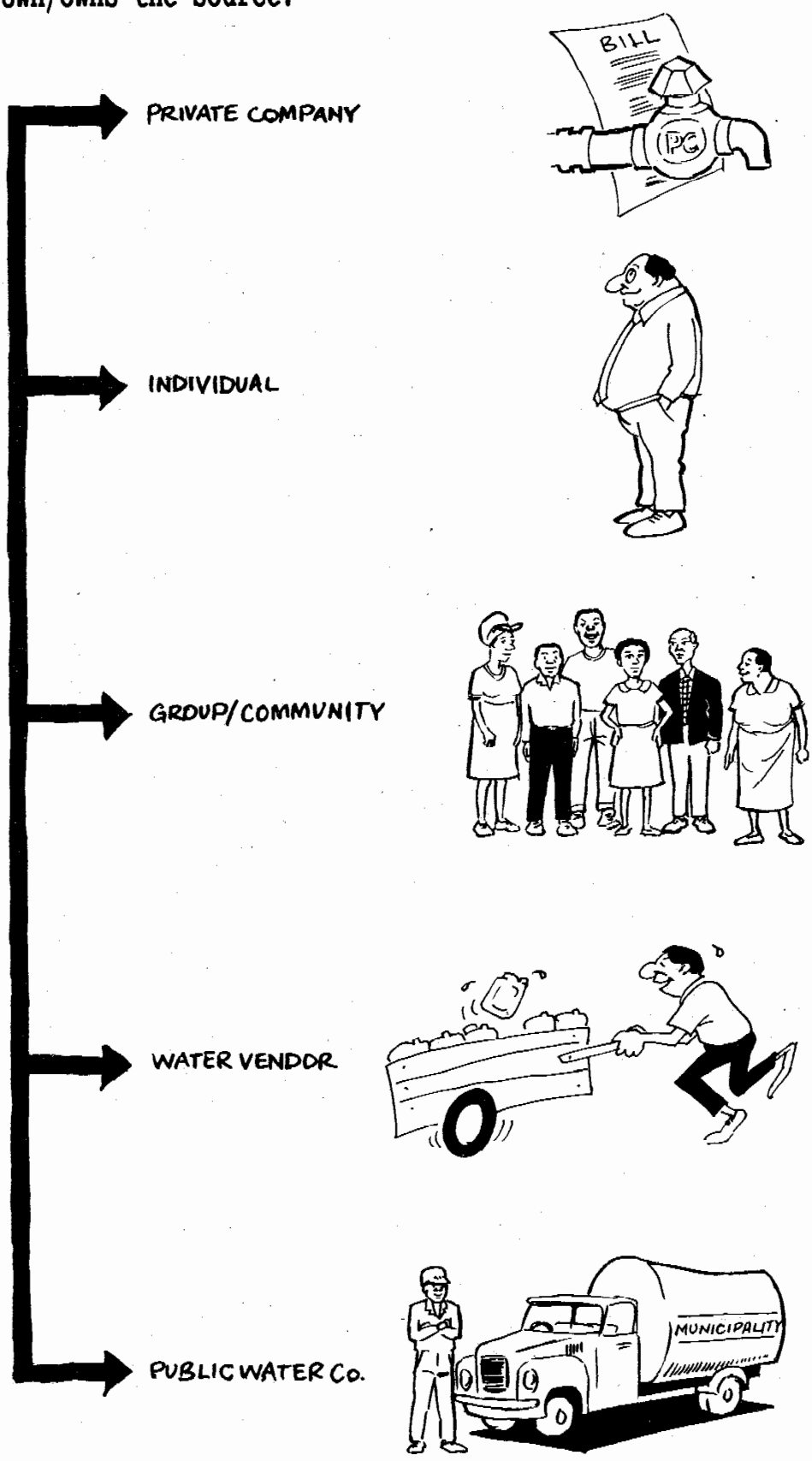
Content of questionnaire:

1. What is source of water?
2. Who owns/own the source of water?
3. What is water used for?
4. What is source of water for each use?
5. How much water is consumed per day and how much does it cost per day?
6. How much water is consumed for each activity and from which source?
7. Is available water sufficient?
8. What is reliability of service?

1. Sources of water.



2. Who own/owns the source.



3. What is use of water?

PERSONAL HYGIENE

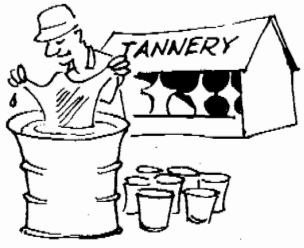
AGRICULTURE / GARDENING

COOKING AND DRINKING

BUSINESS

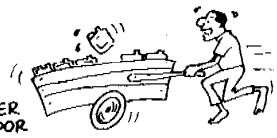
WASHING CLOTHES / HOUSE

COTTAGE INDUSTRIES



4. What is source of water for each use?

COOKING AND DRINKING



WATER VENDOR

RAIN WATER HARVESTING

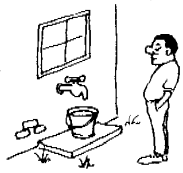
WATER TRUCK

IN-HOUSE WATER TAP

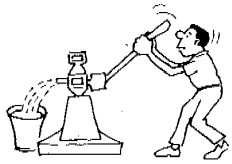
LAKE/RIVER SWAMP

COMMUNAL WATER TAP

WELL



YARD TAP



BORE HOLE

AGRICULTURE/GARDENING

WATER VENDOR

RAIN WATER HARVESTING

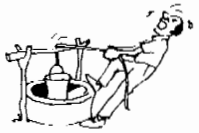
WATER TRUCK

IN-HOUSE WATER TAP

LAKE/RIVER SWAMP

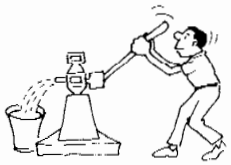
COMMUNAL WATER TAP

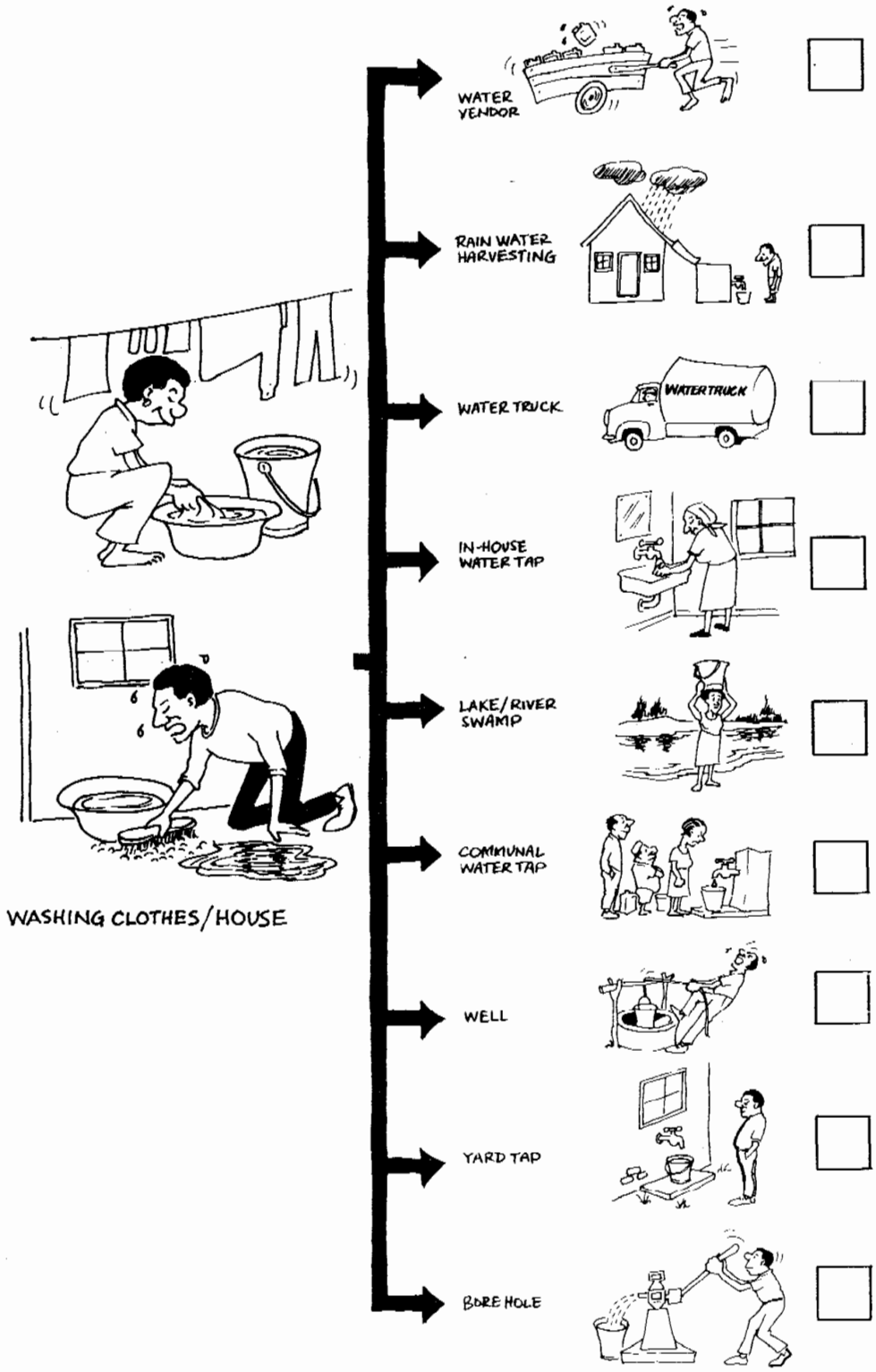
WELL



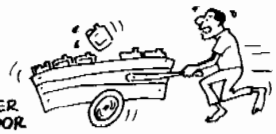
YARD TAP

BORE HOLE




WATER VENDOR
RAIN WATER HARVESTING
WATER TRUCK
WATERTRUCK
IN-HOUSE WATER TAP
LAKE/RIVER SWAMP
COMMUNAL WATER TAP
WELL
YARD TAP
BORE HOLE
WASHING CLOTHES/HOUSE

PERSONAL HYGIENE



WATER VENDOR

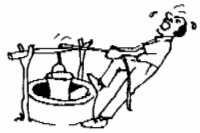
RAIN WATER HARVESTING

WATER TRUCK

IN-HOUSE WATER TAP

LAKE/ RIVER SWAMP

COMMUNAL WATER TAP



WELL

YARD TAP

BORE HOLE

COTTAGE INDUSTRIES

WATER VENDOR

RAIN WATER HARVESTING

WATER TRUCK

IN-HOUSE WATER TAP

LAKE/RIVER SWAMP

COMMUNAL WATER TAP

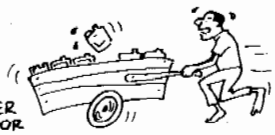
WELL

YARD TAP

BORE HOLE

BUSINESS

WATER VENDOR



RAIN WATER HARVESTING

WATER TRUCK

IN-HOUSE WATER TAP

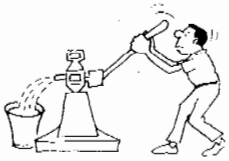
LAKE/RIVER SWAMP

COMMUNAL WATER TAP

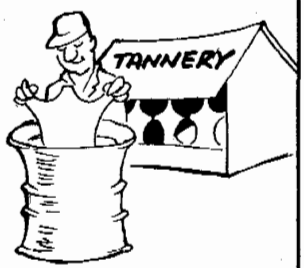
WELL

YARD TAP

BORE HOLE



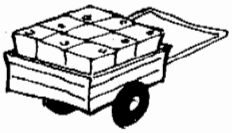
5. How much water is consumed per day? and how much does it cost per day?

USE	No. OF UNITS CONSUMED PER DAY	COST PER UNIT	TOTAL COST
 DRINKING			
 BUSINESS			
 COTTAGE INDUSTRIES			

UNITS OF WATER


BUCKETS


BARRELS


CARTS


JERRY CANS

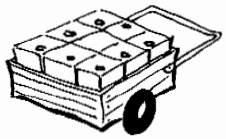

BOTTLES

USE	No. OF UNITS CONSUMED PER DAY	COST PER UNIT	TOTAL COST
 WASHING CLOTHES / HOUSE			
 AGRICULTURE / GARDENING			
 COOKING			
 PERSONAL HYGIENE			

UNITS OF WATER


BUCKETS

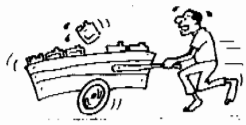

BARRELS

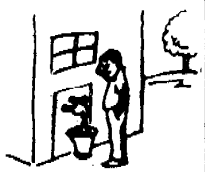

CARTS


JERRY CANS


BOTTLES

6. How much water is consumed for each activity and from which source?

 WATER TRUCK				

7. Is water consumption sufficient? If not, which area of use?

BUSINESS

IS WATER CONSUMPTION SUFFICIENT?

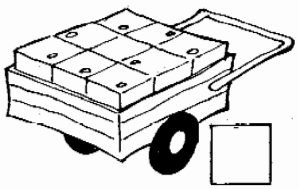
☐ YES

☐ NO

HOW MUCH WATER DO YOU NEED/USE?

☐ No. OF JERRYCANS _____ COST PER JERRY CAN _____ TOTAL COST

☐ No. OF BUCKETS _____ COST PER BUCKET _____ TOTAL COST



☐ No. OF CARTS _____ COST PER CART _____ TOTAL COST

☐ No. OF BARRELS _____ COST PER BARREL _____ TOTAL COST

☐ No. OF BOTTLES _____ COST PER BOTTLE _____ TOTAL COST

COOKING AND DRINKING

IS WATER CONSUMPTION SUFFICIENT ?

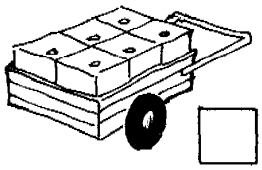
☐ YES

☐ NO

HOW MUCH WATER DO YOU NEED/USE ?

☐ No. OF JERRY CANS _____ COST PER JERRY CAN _____ TOTAL COST

☐ No. OF BUCKETS _____ COST PER BUCKET _____ TOTAL COST



☐ No. OF CARTS _____ COST PER CART _____ TOTAL COST

☐ No. OF BARRELS _____ COST PER BARREL _____ TOTAL COST

☐ No. OF BOTTLES _____ COST PER BOTTLE _____ TOTAL COST

AGRICULTURE/
GARDENING

IS WATER
CONSUMPTION
SUFFICIENT ?

☐ YES

☐ NO

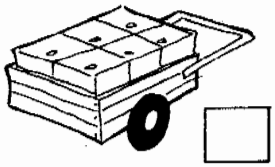
HOW MUCH WATER
DO YOU NEED/ USE ?

☐ _____ _____

NO. OF JERRY CANS COST PER JERRY CAN TOTAL COST

☐ _____ _____

NO. OF BUCKETS COST PER BUCKET TOTAL COST



☐ _____ _____

NO. OF CARTS COST PER CART TOTAL COST

☐ _____ _____

NO. OF BARRELS COST PER BARREL TOTAL COST

☐ _____ _____

NO. OF BOTTLES COST PER BOTTLE TOTAL COST

COTTAGE INDUSTRIES

IS WATER CONSUMPTION SUFFICIENT ?

☐ YES

☐ NO

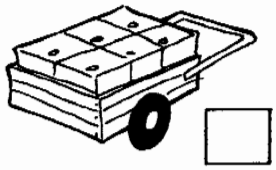
HOW MUCH WATER DO YOU NEED/ USE ?

☐ _____ _____

NO. OF JERRY CANS COST PER JERRY CAN TOTAL COST

☐ _____ _____

NO. OF BUCKETS COST PER BUCKET TOTAL COST



☐ _____ _____

NO. OF CARTS COST PER CART TOTAL COST

☐ _____ _____

NO. OF BARRELS COST PER BARREL TOTAL COST

☐ _____ _____

NO. OF BOTTLES COST PER BOTTLE TOTAL COST

PERSONAL HYGIENE

IS WATER CONSUMPTION SUFFICIENT ?

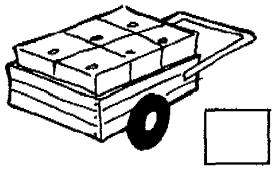
☐ YES

☐ NO

HOW MUCH WATER DO YOU NEED/ USE ?

☐ NO. OF JERRY CANS _____ COST PER JERRY CAN _____ TOTAL COST

☐ NO. OF BUCKETS _____ COST PER BUCKET _____ TOTAL COST



☐ NO. OF CARTS _____ COST PER CART _____ TOTAL COST

☐ NO. OF BARRELS _____ COST PER BARREL _____ TOTAL COST

☐ NO. OF BOTTLES _____ COST PER BOTTLE _____ TOTAL COST

WASHING CLOTHES

IS WATER CONSUMPTION SUFFICIENT ?

☐ YES

☐ NO

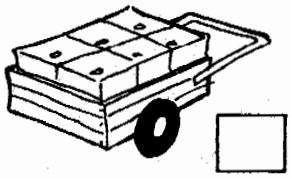
HOW MUCH WATER DO YOU NEED/ USE ?

☐ _____ _____

NO. OF JERRY CANS COST PER JERRY CAN TOTAL COST

☐ _____ _____

NO. OF BUCKETS COST PER BUCKET TOTAL COST



☐ _____ _____

NO. OF CARTS COST PER CART TOTAL COST

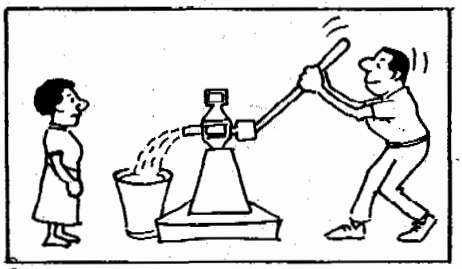
☐ _____ _____

NO. OF BARRELS COST PER BARREL TOTAL COST

☐ _____ _____

NO. OF BOTTLES COST PER BOTTLE TOTAL COST

8. What is reliability of service?



BORE HOLE

EVERY DAY _____
EVERY WEEK _____
EVERY MONTH _____

COMMUNAL TAP

_____ HOURS PER DAY

IN-HOUSE WATER TAP

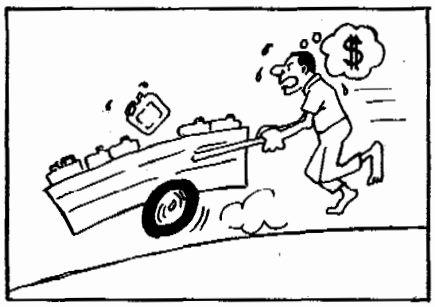
_____ HOURS PER DAY

YARD TAP

_____ HOURS PER DAY

WELL

EVERY DAY _____
EVERY WEEK _____
EVERY MONTH _____

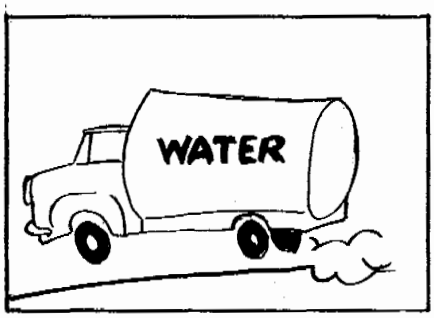


WATER VENDOR

EVERY DAY _____

EVERY WEEK _____

EVERY MONTH _____

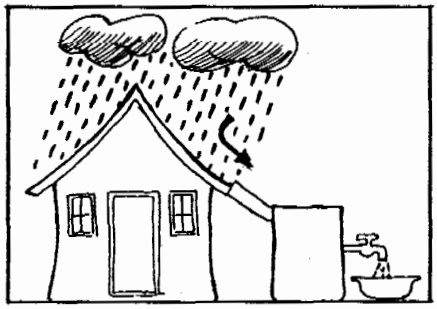


WATER TRUCK

EVERY DAY _____

EVERY WEEK _____

EVERY MONTH _____



RAIN WATER

HOW LONG DOES THE WATER LAST ?

_____ DAYS

_____ WEEKS

_____ MONTHS

LAKE/RIVER/SWAMP

HOW LONG DOES THE WATER LAST ?

_____ DAYS

_____ WEEKS

_____ MONTHS

Annex 8: Sample questionnaire on willingness to pay for water and related data analysis

SAMPLE QUESTIONNAIRE

I. RESPONDENT CHARACTERISTICS :

1. Respondents code number :

   ☐☐☐☐☐☐

2. Name of the family head : .....

3. Status : Father ☐ Mother ☐ Other ☐ (tick as appropriate)

4. Respondent's age :..... years old

5. Number of family members :..... persons

II. OWNERSHIP OF FACILITIES :

6. Do you have piped water installation at home ?
   1. Yes
   2. No ---- If No, then proceed to question 8.

7. Does the installation come from Government Water Supply Company ?
   1. Yes
   2. No

8. Do you have latrine facility ?
   1. Yes
   2. No

9. Do you have well facility ?
   1. Yes
   2. No

III. WATER CONSUMPTION

DRINKING AND COOKING

10.a. What is your daily source of water for drinking and cooking ?

1. Mineral Water
2. Government Water Company
   (a) yard tap
   (b) house connection
   (c) communal tap
3. Private well
4. Water vendor
5. Public well
6. Rain water
7. River or pond
8. Miscellaneous....

10.b. Can you estimate the amount of water used for drinking and cooking per day, and how much it costs ?

Amount of water used/day : .....litres

The cost : US $/ Rp .....

10.c. Do you have enough water for drinking and cooking for your daily need ?

1. Yes ——————————————> direct to number 11 a
2. No

10.d Why don't you have enough water?	yes	no
no regular supply	—	—
water too expensive	—	—

10.e. If not enough, how much water do you really need (for drinking and cooking) per day? And how much will that cost ?

The actual amount of water needed/day : .....litres

The cost : US $/Rp .....

10.f How do you manage to make up for the shortfall in your needs?

.....

PERSONAL HYGIENE

11.a. What are your daily sources of water for washing and bathing ?

1. Mineral Water
2. Government Water Company
   (a) yard tap
   (b) house connection
   (c) communal tap
3. Private well
4. Water vendor
5. Public well
6. Rain water
7. River or pond
8. Miscellaneous....

11.b. Could you estimate the amount of water for washing and bathing per day, and how much it would cost?

The amount of water : .....litres

The cost of water : US $/ Rp .....

11.c. Do you always have enough water for your bathing and washing needs ?

1. Yes ——————————————————> direct to number 12
2. No

11.d	Why don't you have enough water?	yes	no
	no regular supply	—	—
	water too expensive	—	—

11.e If not adequate, how much would you need to meet your daily needs for bathing and washing every day ? And how much will that cost?

The amount of water needed : .....litres

The cost of water : US $/ Rp .....

11.f How do you manage to make up for the shortfall in your needs?

.....

CLEANING, URBAN CROPPING, INFORMAL SECTOR WORK AT HOME

12.a. What is your course of water for domestic industrial work, cleaning and food growing?

1. Mineral Water
2. Government Water Company
   (a) yard tap
   (b) house connection
   (c) communal tap
3. Private well
4. Water vendor
5. Public well
6. Rain water
7. River or pond
8. Miscellaneous....

12.b. Can you estimate the amount of water used for domestic, industrial work, cleaning and food growing per day, and how much it will costs?

Amount of water used/day: ..... litres
The cost : US $/Rp. .....

12.c. Do you have enough water for domestic use, industrial work, cleaning and food growing?

1. Yes
2. No

12.d Why don't you have enough water?	yes	no
no regular supply	—	—
water too expensive	—	—

12.e If it is not enough, how much would you really need? And how much will that cost?

The amount of water needed/day: ..... litres
The cost of water : US $/Rp. .....

12.f How do you manage to make up for the shortfall in your needs?
.....

IV. WILLINGNESS TO PAY

13. If the coverage of water supply is expanded to include this area, would you be willing to get the installation?

    1. Yes
    2. No ——————————————> direct to number 15

14. How much can you afford to pay (a) for the water installation and (b) how much will you be willing to pay for the water consumption per metre cubic?

    (a) Willingness to pay for installation US $./Rp .....

    (b) Willingness to pay for water consumption :
    US$/Rp ...../ cubic metre or ..... US $/Rp. per month

15. Can you give the reason why you can't afford to pay for water installation ?

    Reason(s) :.....

16. Are you satisfied with the quality of water provided by the public water company ? (tick as appropriate)

satisfied	less satisfied	not satisfied
☐	☐	☐

    - color
    - taste
    - smell
    - cleanliness
    - distribution
    (continuity of availability)

17. If required to prefinance the extension of services to your area, how much money would you be willing to pay for the following items?

    1. Installation — US $/Rp. .....
    2. Water price per m^3 — US $/Rp. .....
    3. Minimum price per month — US $/Rp. .....

18. Are you confident that you can afford the expenditure for water?

	yes	no
(a) installation costs	—	—
(b) monthly costs	—	—

HOW TO GROUP DATA AND FILL IT INTO TABLES FOR TIIE PURPOSE OF ANALYSIS

This part provides an example how to group data related to above questionnaire and how to fill it into tables for the purpose of analysis. Community volunteers would have to be trained in this exercise.

Table I IDENTITY OF RESPONDENT

No. Respondent	Name	Age (years)	Number of Family
1.	Joni	45	5 person
2.	Freddy	50	4 person
3.	Antoni	55	6 person
4.			
5.			
and so on....			
50.			

This table can be used for the tabulation of respondent answers related to personal identity (no 1 - 5). The process is simple, one person could read the respondent number, name, age, and the total number of family members while another one writes the information into the table.

Sample of table I was filled in with data from three respondents, name Johny, Freddy and Antoni, and their characteristic (age, and family members). This is continued for 50 households in a neighbourhood .

Table II. OWNERSHIP OF WATER INSTALLATION

Remarks	Family with an installation	Family without an installation	Total No. of respondents
Tally	IIIII	IIII IIII IIII IIII IIII IIII IIII IIII IIII	
Number of tally	5	45	50
Percentage	10%	90%	100%

Table II provides an example of how to record the number of families with an installation and without an installation. The procedures for recording are as follows:

1. To write down tally line

   Each tally should be written in a column related to the answer of the respondents. If the respondent has given a "yes" answer for question 6, then the writer will place one tally in column depicting "family with an installation".

   If the answer is "no", then the tally mark will be placed in the column "family without an installation".

2. To add all tallies

   The add all tallies please count all in each category and fill total into box.

3. To calculate the percentage (in most cases not necessary)

$$\frac{\text{Number of tally}}{\text{Number respondent}} \times 100 = \ldots\ldots\ldots\ldots \%$$

For many communities percentage calculations are not feasible, and should thus not be attempted. Table III provides a further example for the ownership of a toilet and well.

Table III OWNERSHIP OF TOILET AND WELL

Remarks	Family has latrine	Family doesn't have latrine	Family has well	Family doesn't have w
Tally	IIII IIII IIII	IIII IIII IIII IIII IIII IIII IIII	IIII IIII IIII IIII	IIII IIII IIII IIII I IIII
Total	15	35	20	30
Percentage	30 %	70 %	40 %	60 %

Table IV A : Water sources for washing and cooking

Remarks	Mineral water	Municipal water corporation	Private artesian well	Water seller	Public Hidrant	Public water	Rain water	River or pond	Etc
For drinking and cooking	IIII IIII	IIII	IIII IIII IIII	IIII IIII IIII	III	II	0	0	0
Number	10	5	15	15	3	2	0	0	0
Percentage	20%	10%	30%	30%	6%	4%	0	0	0
For bathing and washing	0	IIII	IIII IIII IIII	IIII	IIII	IIII IIII IIII	0	IIII I	0
Number	0	5	15	5	4	15	0	6	0
Percentage	0	2%	30%	10%	8%	30%	0	12%	0
For working, cleaning and growing	0	III	IIII IIII IIII	IIII	IIIII	IIII IIII IIII IIII IIII	0	IIII	0
Number	0	3	14	4	5	20	0	4	0
Percentage	0	6%	28%	8%	10%	40%	0	8%	0

DATA RECORDING IN TABLE IV A

This table is completed with the respondents answers from questions number 10a, 11a and 12a. Again, the recording procedures are the same as those applied in table II. From 50 respondents in the sample of table IV A; 10 respondents (20%) were using mineral water, 5 respondents (10%) municipal water, 15 respondents (30%) from privately owned pump, 3 respondents (6%) water from a public hydrant, 2 respondents (4%) public well water and none of the respondents obtained water from the river or rain water for drinking and cooking purposes.

For bathing and washing, none of the respondents used mineral water and rain water. From other sources, 5 respondents (10%) obtained water from the municipal water supply, other 5 (10%) from water vendors, 4 (8%) from public hydrant, 15 (30%) from a private hand-pump, fifteen (30%) others from a public well and 6 (12%) from either a pond or a river.

For domestic industrial work, cleaning and food growing, none of the respondents used mineral and rain water. But from other sources, 3 (6%) respondents used water from municipal water supply, 4 respondents (8%) bought from a water vendor, 14 respondents (28%) from a privately owned hand-pump, 5 respondents (10%) from a public hydrant, 20 (40%) from a public well and 4 respondents (8%) from either a river or a pond.

Table IV B. Water for drinking and cooking

Respon-dents	The amount of water used for drinking & cooking per day	The Cost	The current water demand	The cost of current demand for water
Joni	10 buckets	$ 1	15 buckets	$ 1,5

RECORDING DATA IN TABLE IV B

This table is filled with the respondents answers from questions number 10B and 10D.

Joni consumes 10 buckets of water per day, for drinking and cooking purposes, and spends $ 1 . The amount of water that he actually needs for this purpose are 15 buckets which will cost him $1,5 per day.

Table IV C. Water for washing and bathing

Name	Amount of water for bathing & washing	The costs	The current demand for bathing & washing water	The costs for the current demand
Joni	25 buckets	$ 5	40 buckets	$ 8

RECORDING DATA IN TABLE IV C

This table is filled with respondents answers from questions number 11a and 11b.

Joni consumes 25 buckets of water per day, for washing and bathing. This costs him $ 5. But he actually needs 40 buckets of water to satisfy his current needs, which can cost him $ 8 per day.

Table IV D Water for informal domestic work, cleaning and growing food

Name	Water used for work, cleaning & growing food per day	The costs	The current demand for water per day	The costs for the current demand
Joni	25 buckets	$ 5	50 buckets	$ 10

RECORDING DATA IN TABLE IV D

This table is filled with respondents answers from questions number 12 Joni consumes 25 buckets of water per day, for domestic industrial work, cleaning and food growing. This costs him $ 5. The amount of water he actually needs for domestic industrial work, cleaning and growing food are 50 buckets which will cost him $ 10 per day.

The table below shows the number or the percentage of families who are willing and those not willing to pay for a water installation

Table V Families willingness to pay for water installation

Remarks	Willing to pay for installation	Not willing to pay for installation
Tally	𝍸 𝍸 𝍸 𝍸 𝍸 𝍸 𝍸	𝍸 𝍸 𝍸
Number of tallies	40	10
Percentage	80%	20%

RECORDING DATA IN THE TABLE V

The answers for question number 12 have to be filled as shown in the above table using a similar procedure as in table II (see recordings in table II). The samples in this table shows 40 respondents (80%) who are willing to pay for water installation while 10 (20%) are not willing to pay.

Table VI Amount willing to pay for water

No.	Name of respondent	Amount willing to pay for installation in $	Amount willing to pay for consumption in $	Ability to pay (assessment by interviewer)
1.				
2.				
3.				
4.				
5.				
6.				
7.	Rony	$ 50	$ 7	capable
8.	Muhammad	$ 35	$ 5	not capable
9.				
10.				

RECORDING DATA IN THE TABLE VI

The last column in this table gives an estimation of the respondents capability to pay for water installation as subjectively estimated by the interviewer.

Respondent number 7(Rony) is willing to pay for installation costs at $ 50 and consumption costs at $ 7. This is confirmed by the interviewers estimate that he is capable to pay. In contrast respondent number 8.(Muhammad) is willing to pay $35 as installation costs and $5 as consumption costs. This respondent is assessed as being not capable to pay.

Whereas the above table has focused on the willingness and capability to pay for water, the table below enlists the respondents who are not willing to pay and the reasons why they are not willing.

Table VII Reasons why a respondent is not willing to pay for water installation

No	Name of respondent	Reasons for Unwillingness to pay for water installation
1.	Joni	Expensive
2.	Freddy	The supply of clean water is adequate
3.	Antoni	Low-income